



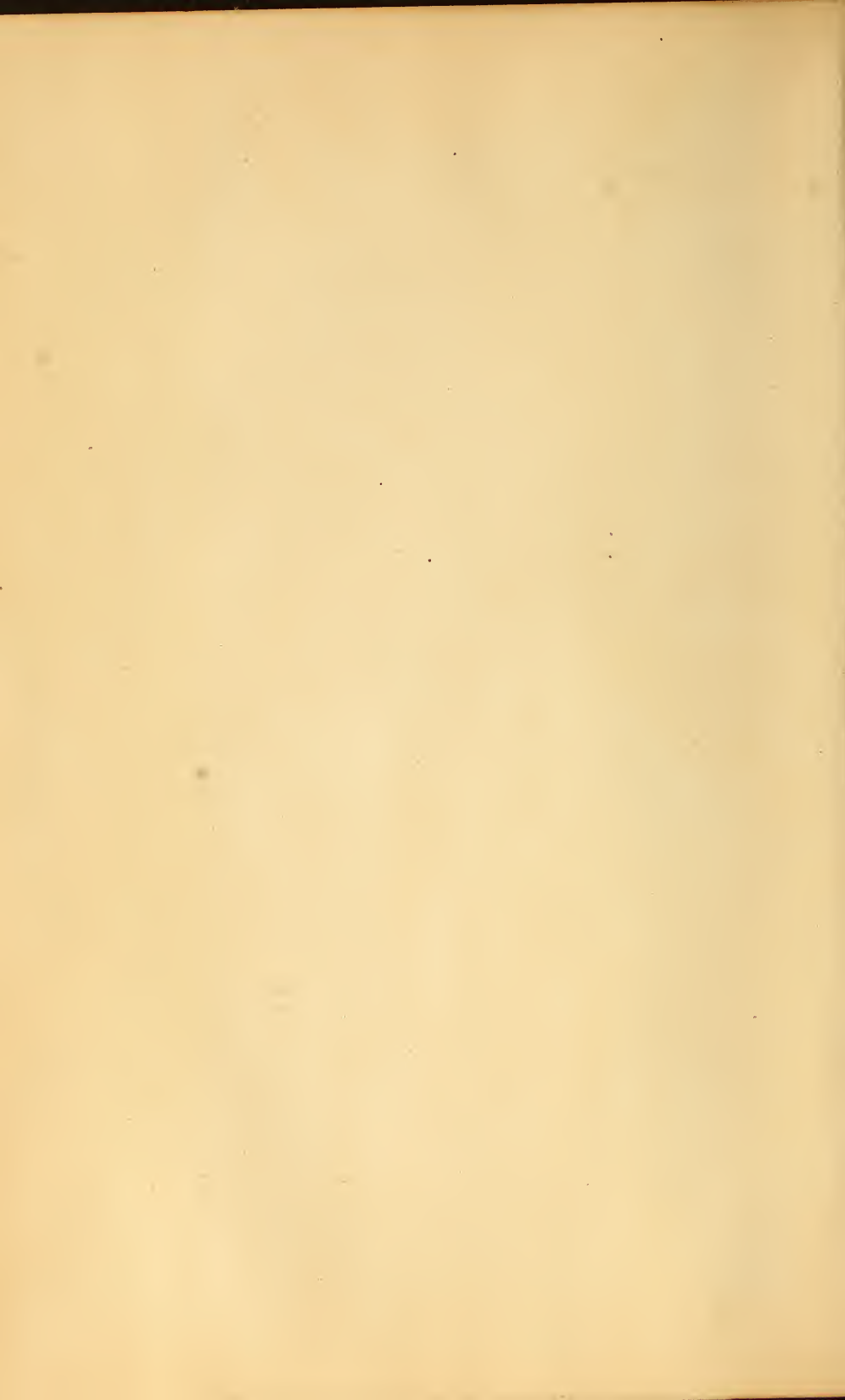
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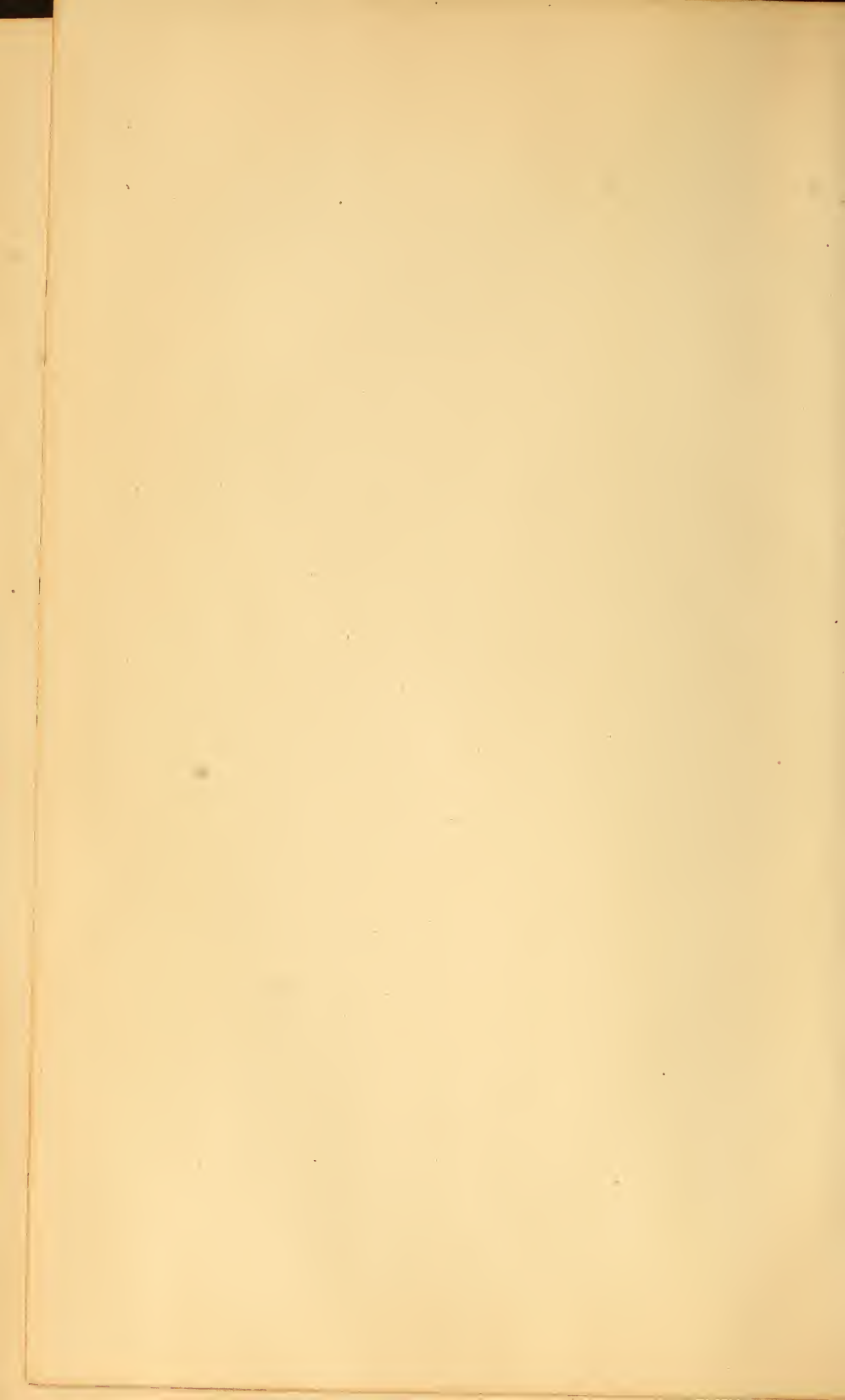
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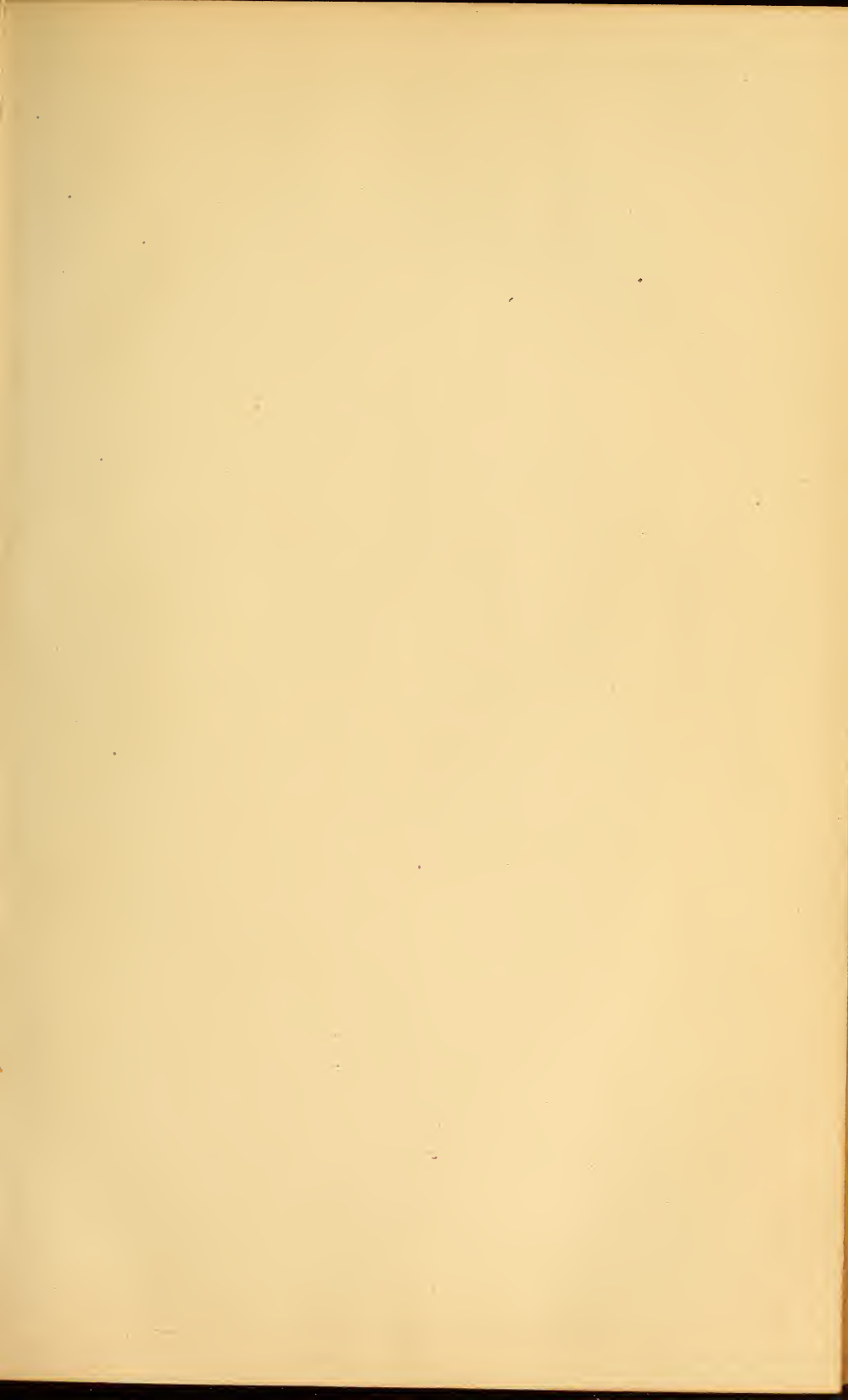
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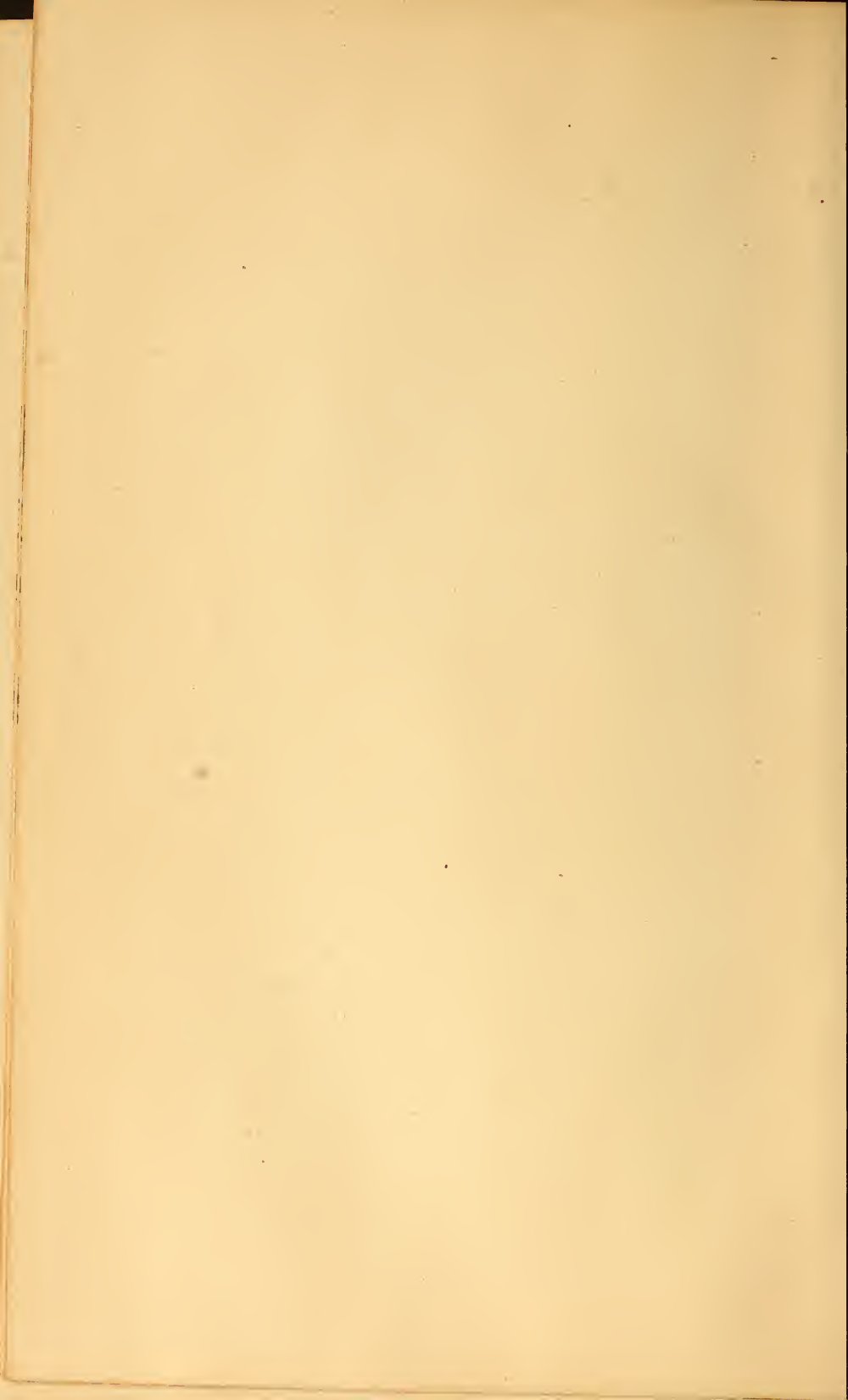










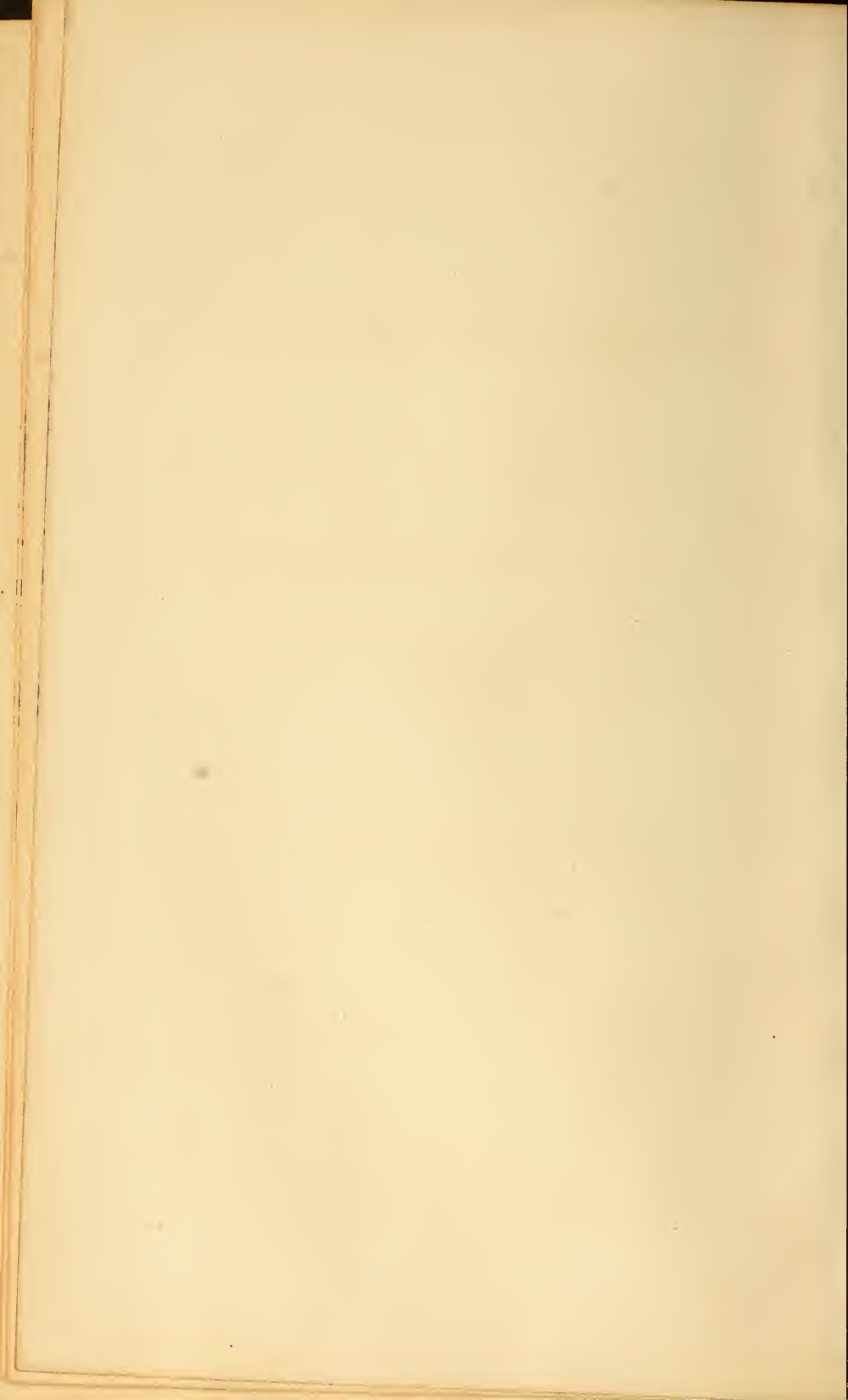




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SYLLABUS

OF

A COURSE OF LECTURES

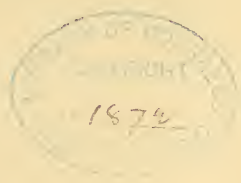
DELIVERED IN THE

ALABAMA MEDICAL COLLEGE,

MOBILE.

BY J. C. NOTT,

PROF. OF SURGERY.



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## P R E F A C E.

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MY time, between the organization of our College in the spring of 1859 and the commencement of the lectures in the following autumn, was spent in Europe, collecting our museum, and I entered upon my course without preparation. There being no text-book on surgery well adapted to the short course of instruction in the schools of the United States, (like those of Dorsey and Gibson in their day,) I felt the want of a more regular plan for my own convenience, and of some printed guide for the students to direct their reading. I therefore determined, as soon as the course was ended and leisure would permit, to write out and print a Syllabus. Unfortunately, however, I was attacked with a severe inflammation of the eyes, from which I am but just recovering, and which has prevented me from carrying out my design in a satisfactory manner. I started for the mountains of Virginia early in June, with my eyes bandaged from the light, and hoping that I might still get well enough to read and write; put in my trunk the "System of Surgery," by Professor Gross, which is the most complete, the best arranged, and, as a whole, best work on the subject in our language. I have followed very nearly the arrangement of Dr. Gross; have indorsed the general principles he has laid down, and, as my amanuensis was not fa-

miliar with professional terms, etc., I have often had his very language copied. My object has not been to write a book, or to claim originality, but simply, under the circumstances, to make something which would be useful to the class. There will be found omissions, typographical errors, etc., in consequence of my inability to look over the manuscript and printed sheets while passing through the press.

Notwithstanding all the defects above alluded to, I feel assured that this Syllabus will be a great assistance to the class, and will facilitate its members much in their course of study and preparation for the final examination.

I hope before another year to publish a more complete edition.

J. C. NOTT.

# SYLLABUS.

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THE laws of disease, like those of health, are obscure, and to a great extent beyond the reach of our investigations. We do not understand their true essence, and are often obliged to deal with effects. Hence we use conventional terms in our description of diseases, which are faulty in themselves, and whose definitions are unsettled and imperfect. Such for example are the terms **Irritation**, **Congestion**, and **Inflammation**. They are made to represent certain phenomena that occupy the attention of the surgeon every moment at the bedside, and require to be carefully studied.

A normal state of the nervous system, and of the blood and its circulation through the organs of the body, are conditions indispensable to health; and whenever one or the other is deranged, diseased action is the consequence.

## IRRITATION.

**Irritation** may be defined a disordered state of the nerves of the affected part, attended with more or less pain and functional disturbance, but *not with inflammation*, although it may lead, if not arrested, to that result. Its prominent symptom is **nervous** derangement; it bears the same relation to the nervous that inflammation does to the vascular system. The one consists essentially in disordered *sensation*, the other in disordered *circulation*.

Irritation may be limited in extent, local or widely diffused, manifesting itself in many points, constituting general irritation.

Irritation is direct or indirect, according as it results from local cause or sympathy.

**Examples** of these different forms.

An irritable state of the system greatly interferes with the reparative process, as healing of wounds, union of fractures, etc.

**Treatment.**—Remove the cause; correct secretions; palliate and combat symptoms, etc.

## CONGESTION.

Difficulty of settling the boundaries between this and inflammation, so nearly are they related.

**Definition.**—Congestion is the accumulation of blood in a part, either from mechanical obstruction or some vital defect in the circulation interfering with the movement of this fluid. It is an accumulation of blood in a part, unaccompanied by the phenomena of true inflammation.

Congestion, divided into **Active** and **Passive**.

The first is characterized by increased action, heat, redness, and disturbance of function, and if allowed to progress, leads to deposits of serum and lymph.

Passive congestion, on the other hand, is distinguished by the dark color of the part, dilated, sluggish state of the vessels, and its slow march.

Sometimes improperly termed **Arterial** and **Venous** congestion; but one set of vessels cannot be implicated without the other.

Active congestion then is closely allied to inflammation, and when it results in morbid deposits, it becomes inflammation.

Active congestion does not necessarily result in inflammation; if the cause be removed it may cease.

**Examples.**—Congestion of the conjunctiva from an irritant; plunge the hand in cold water, etc. etc.

**Internal congestion** similar to external.

Distinction between active congestion and **determination** of blood to a part.

**Examples** of latter.—Infant at the breast; menstruation; blushing; congestion; chills and fevers, and other forms of congestion.

**Passive Congestion.**—In this the morbid action is more sluggish; the vessels are distended, often varicose, tortuous, elongated and incapable of contracting on their contents. The discoloration is dark, venous, or purple; circulation very languid, and often deposits of serum or lymph in the areolar tissue take place.

**Causes of Passive Congestion** are—

- 1st. Inflammation.
- 2d. Mechanical obstruction.
- 3d. Debility.
- 4th. Dependent position.

**Examples** of each.



## INFLAMMATION: ITS IMPORTANCE.

The present state of our knowledge does not enable us to give a satisfactory definition of this term; the following, of Professor Gross, may be regarded as one of the best:—

“Inflammation may be defined to be a perverted action of the capillary vessels of a part, attended with discoloration, pain, heat, swelling, and disordered function, with a tendency to effusion, deposits, or new products. In addition to these changes, there is also an altered condition of the blood and nervous fluid as an important element of the morbid process.”

**Causes of Inflammation—endless.**

**Predisposing—**what? Examples.

**Exciting—**what? Examples.

**Extension of Inflammation.**

Commences in a **point**.

Extension by **continuity**.

Extension by **contiguity**.

Extension through **veins** and **lymphatics**.

Extension through nervous agency—**sympathy**.

Extension through the **blood**.

**Varieties of Inflammation.**

All the tissues susceptible of inflammation, except, perhaps, epidermis, hair, and nails.

Susceptibility of a part to inflammation, as a general rule, in direct proportion to the amount of its vascular and nervous endowments; the importance of its functions and nature of its exposure.

Brain and heart most important exceptions.

**Acute** and **chronic** inflammation—what?

**Healthy** and **unhealthy** inflammation—what?

**Common** and **specific** inflammation—what?

**Latent** inflammation—what?

**Terminations** or events of inflammation.

In reality there are but two—one in **health**, the other in **death** of the part.

The first occurs by **delitescence** and **resolution**.

The second occurs by **ulceration** and **gangrene**.

Symptoms of acute inflammation are both local and constitutional. Most prominent local symptoms are **redness, heat, swelling, and pain.**

1. **Discoloration or redness;** its phenomena.  
Explanation.  
Value as a diagnostic sign.
  2. **Pain**—one of the most constant symptoms.  
Varies in degree and kind.  
Sometimes remote from seat of disease.  
Most severe in the coverings of organs.  
Difference in the pain of inflammation and of spasm.  
Characters of neuralgia.  
Pain not always present in inflammation.  
Sudden disappearance often indicative of danger.  
How is pain produced?  
Importance in pointing out the seat and danger of disease.  
Throbbing pain denotive of suppuration.
  3. **Swelling**—seldom though sometimes absent.  
Progress variable.  
Varies in character.  
Beneficial or dangerous.  
Immediate **cause** of swelling.
  4. **Heat**—one of the most common effects of inflammation, and valuable guide.  
Degree of heat in inflamed tissues.  
Experiments of John Hunter.
  5. **Functional disorder** produced by inflammation.  
Increased sensibility.  
Increased irritability.  
Suspension of special functions, eye, ear, etc.  
Disorder of secretions.  
Absorption impeded or suspended.
- Constitutional symptoms.**  
Not always present.  
Vascular system.  
Countenance.  
Respiratory organs.  
Digestive organs.  
Renal secretion.  
Muscles.  
Brain.  
Emaciation, etc.

## CHANGES OF THE BLOOD IN INFLAMMATION.

Influence on fibrin of inflammation.

Influence on red globules.

Buffy coat explained.

## LOCAL PHENOMENA OF INFLAMMATION.

If an irritant be applied to a sensitive living part, as for example a drop of alcohol, or point of a needle to the web of a frog's foot, the following phenomena which characterize the first steps of the inflammatory process are seen to occur:—

1st. There is a contraction of the capillary vessels, with partial arrest of the flow and oscillation of the blood corpuscles. If the irritation be slight, this effect is of but short duration, and the blood in a few seconds resumes its course.

2d. If the irritation be more powerful, the vessels immediately dilate beyond their normal capacity, and a larger quantity of blood is admitted, the red globules being sent in with more velocity and in larger number by the increased action of the heart. The vessels become more and more expanded—extended to the utmost with the blood which stagnates—the function of the vessels and the function of the part are obliterated, and the coats of the vessels become thinned and softened.

All this may be well studied in the conjunctiva of the eye when suddenly irritated.

If the process runs high, blood is often extravasated through the coats or rupture of the vessels, and the parts are surrounded by great congestion of the vessels supplying them. The pulsation in the surrounding arteries is increased in force. There is also a copious exudation of lymph or plasma in the inflamed part, and an effusion of serum in the areolar tissue around. Next comes the formation of pus.

In certain tissues, as the arachnoid membrane, the aponeuroses, cartilages, and nerves, we have no evidence, often, even in violent cases, of the exudation of lymph or formation of pus; and these should not then, as contended by Miller, Bennett, and others, be regarded as essential phenomena of inflammation. Inflammation may and does exist without them.

The nerves are doubtless deeply concerned in the development and progress of the inflammatory process, but in what manner we know not. Pain we know plays an important part in it, and the heart and other organs soon become implicated through the nervous system.

## TREATMENT OF INFLAMMATION.

- 1st. Remove exciting cause.
- 2d. Promote resolution if possible.
- 3d. Moderate and direct its action.

**Treatment both constitutional and local.**

The **constitutional** remedies are blood-letting, cathartics, emetics, depressants, mercurials, diaphoretics, diuretics, anodynes, and the antiphlogistic regimen.

Importance of prompt treatment.

Mode of action and manner of using.

Blood-letting.

Cathartics.

Emetics.

Depressants; nauseants; digitalis; aconite; veratrum viride.

Mercurials.

Diaphoretics.

Anodynes.

Antiphlogistic regimen.

**Local** remedies consist of rest, position, abstraction of blood, cold and warm applications, compression, counter-irritation, sedatives, anodynes, etc.

Mode of action and application of.

Rest and position.

Local bleeding.

Cold and warm applications compared.

Cold water.

Warm water.

Fomentations.

Stuping.

Poultices.

Nitrate of silver.

Iodine.

Compression.

Counter-irritants.

Destructives.

Blisters; setons; issues.

## CHRONIC INFLAMMATION.

In what does it differ from acute inflammation?

Its results.

Various forms.

**Treatment**—general principles.

Importance of attending to state of the system.

**Terminations and Results of Inflammation.**

*Resolution*—definition of.

*Delitescence*—definition of.

Examples of both.

**Deposition of Serum.**

A common attendant of inflammation.

Cellular and serous tissues supply it most abundantly.

Also poured out occasionally in large quantities from mucous membranes, as alimentary canal, etc.

From skin, as in scalds, blisters, erysipelas, etc.

Œdema; œdema of glottis; peritoneal and plural cavities afford other examples.

Serum effused is generally limpid; when turbid, it is a mark of inflammation; may contain blood, lymph, or pus.

Dr. Gross contends that the effusion is *always* the result of inflammation; this opinion not general.

**Fibrinous Exudation.**

The terms fibrin, lymph, coagulable lymph, plasma, plastic matter, are synonymous.

Inflammation rarely occurs without exudation of fibrin; in many cases it is almost the only product of the morbid action, as in croup, peritonitis.

It is generally associated with serum; often with blood or pus, which denote a higher grade of inflammation than the mere effusion of serum.

The capacity for furnishing fibrin in inflammation differs much in different times and organs.

Most copious from serous membranes, cellular tissues, certain portions of mucous system, as the faucial, laryngeal, intestinal, and uterine.

Very little is effused from fibrous membranes, muscles, tendons, vessels, nerves, cartilages, or bones (except in fractures.)

Sometimes fibrin is copiously effused in a few hours, at other times it commences and continues very slowly for an indefinite period.

**Appearance** of fibrin or lymph when first poured out.

**Time and manner** of its organization.

#### **Use of Plastic Matter.**

John Hunter was the first to describe its properties and uses.

Manner of dressing wounds and healing for first intention.

Parts entirely separated are sometimes made to unite.

Taliacotius; noses; lips; ears.

Du Hamel ingrafted the cock's spur into his comb.

Hunter transplanted a human tooth in the same way.

Use of plasma in suppression of hemorrhage, radical cure of hernia, etc.

Use in circumscribing morbid action as in abscesses, etc., and in inclosing foreign bodies, balls, needles, etc.

Use in obliterating serous cavities, hydrocele, etc.

#### **Injurious Effects of Plastic Matter.**

Although lymph has many important *uses*, it may on the other hand produce many injurious effects.

Among the latter may be placed—1st. Mechanical obstruction of natural outlets of the body. 2d. Change of structure by interstitial deposits. 3d. Abnormal adhesions. 4th. Induration and enlargement.

**Mechanical Obstruction.**—Croup, in which the plastic matter is exuded on the external surface of mucous membrane of larynx and trachea; strictures of urethra, rectum, etc., where the lymph is exuded beneath the membrane.

**Interstitial Deposit.**—This occurs in almost all cases of inflammation, in whatever situation or degree; hepatization of lungs; opacity of cornea; enlargement of testicle; lymphatic glands; liver in hepatitis, etc. etc.

**Abnormal Adhesions** are results of inflammation and exudation of plastic matter; adhesions of pericardium; synovial membranes; peritoneum; pleura; vagina; muscles; tendons, etc.

**Induration and Enlargement.**—Stiff, thickened joints; enlarged testicle, liver, spleen, tonsils, lymphatic glands, etc. are examples.

**Treatment.**—**Constitutional** remedies are mercury; iodine; attention to secretions, digestive organs; tonics, etc.

**Local** remedies, mercurial ointment or plaster; iodine; compression; cold douche; frictions; blisters, etc.

**Suppuration.**

This is the process by which pus is formed, and is one of the common and most important results of inflammation.

It denotes a higher grade of inflammation than the mere deposition of serum and lymph. Inflammation of certain kinds and in certain tissues occur, with copious exudation of serum, fibrin, and even blood, and **without** suppuration.

It has been held by some, that pus may be formed without inflammation, but this opinion is generally repudiated at the present day.

Pus may be formed without any solution of continuity of the affected part, as in the serous and mucous membranes; also in the cellular substance, lungs, brain, liver, and other viscera, where pus is often seen without ulceration.

The tendency to formation of pus varies in different organs and tissues.

Of the viscera, the liver, lungs, and brain; of the tissues, the cellular, cutaneous, mucous, and serous, are most prone to suppuration.

In the fibrous, cartilaginous, tendinous, and osseous structures, it takes place more imperfectly and with more difficulty.

Some portions of the mucous system are more liable to suppuration than others. More common in the colon, in the vagina, urethra, in the nose, in the fauces, than in the stomach, uterus, bladder, mouth, or œsophagus; in the bronchia than the larynx.

So in the serous system, suppuration is most frequent in the pleura, tunica vaginalis, in the large joints.

Blood-vessels rarely suppurate. Lymphatics are not much liable to it, but the lymphatic ganglions are, as in the groin, axilla, neck, etc.

Nervous and muscular tissues seldom suppurate.

The period at which suppuration may occur, after the establishment of inflammation, varies from twenty-four hours to three or four days on an average, according to tissue or organ affected, intensity, cause of the morbid action, and condition of the system.

Mucous membranes, particularly when exposed to the air, suppurate readily. Serous membranes, on the contrary, suppurate with difficulty, except when exposed to the air; in their natural, closed condition, they pour out serum, are naturally inclined to exude lymph, and to adhesive inflammation.

**Veins** are much more liable to inflame and suppurate than arteries; fortunate it is so, as arteries often require ligatures, and veins do not.

In many of the viscera, brain, liver, etc., pus forms very rapidly sometimes.

The more intense the inflammation, as a general rule, the more

rapid the formation of pus. The period differs much in the grades of simple and in the specific forms of inflammation—as a common boil, chancre, scrofula, variola, etc.

Exposure of an inflamed surface to the air greatly promotes supuration, and is a preventive of adhesion; and this should be remembered in dressing wounds.

Pus, when first effused, appears in distinct globules, dispersed through the affected tissues; at length they are collected into a mass; the tissues are broken down and disappear, and an **abscess** is the result.

The characters of pus cannot be properly studied without the use of the microscope.

When genuine, or healthy, pus is of a white, yellowish tint, opaque, homogeneous, of a sweetish taste, without smell, and consistence of thin cream. It is heavier than water, in which it is partly dissolved; emits a faint, mawkish odor on being heated to the natural temperature of the body; resists putrefaction with remarkable pertinacity, and is coagulated by heat, alcohol, and hydrochlorate of ammonia.

By chemical analysis, pus is shown to contain most of the elements of blood. Microscopically examined, it is found to be composed of numerous small corpuscles suspended in a thin transparent fluid, called pus liquor. The globules vary from the  $\frac{1}{2000}$  to  $\frac{1}{3000}$  of an inch in diameter. Pus also contains shreds of fibrin and several varieties of corpuscles.

Besides pure, healthy or laudable pus, there are several other varieties with different names. **Sanious, serous, ichorous, or sanguinolent** pus, is thin, almost transparent, of a yellowish, oily, or reddish color, and generally so acrid as to erode the parts with which it comes in contact. This is the result of unhealthy inflammation, and is seen in caries of bones, irritable ulcers, cancers, etc.

**Fibrinous** pus consists of common pus mingled with lymph; it is whitish or ashy in color, and of semiliquid or lardaceous consistence; most common in joints and splanchnic cavities; in metastatic abscesses and corpuscular inflammation.

**Scrofulous** pus is seen in the lungs, cold abscesses, scrofulous disease of joints, and in lymphatic ganglions. Usually separates into two parts, of which one is thick, straw colored, and inodorous; the other thin, ropy, and mixed with small, opaque, curdy flakes. Is often very offensive in odor.

**Muco-purulent** pus is a term applied to certain discharges from mucus, epithelial scales, etc.; from nose, eye, bronchial tubes, genito-urinary apparatus, etc.



Certain kinds of pus, the result of specific inflammations, are contagious, as small-pox, gonorrhœa, chancre, etc. ; but we know nothing of the manner in which the poison is generated, or by which it acts.

The question as to the production or formation of pus is one which has not yet been satisfactorily answered, and I will not occupy your time with speculations. The tissues of the part affected are in some way softened and broken down, the elements of the blood become changed, and pus results; but how the change is produced we know not.

Pus may be absorbed, perhaps in all its varieties, as is evinced by the disappearance of abscesses.

## ABSCESSSES.

An abscess is a circumscribed cavity of abnormal formation, containing pus.

Purulent effusion is where pus is poured out into a natural cavity, as chest, joint, etc.

**Phlegmonous** abscess is one which runs its course rapidly, and is accompanied by high inflammation.

**Symptoms** of—are.

**Anatomy** of.

The pus accumulates in the cavity and is circumscribed by the gluing up of the cellular tissue around by adhesive inflammation. There is no distinct sac formed, as has been asserted. The pus attempts to reach the nearest surface through the action of the absorbents. The pressure of the pus aids the process much.

Thus three processes are going on during the formation of an abscess: deposit of pus, effusion of lymph, and ulceration.

Importance of the adhesive inflammation in preventing the diffusion of pus in surrounding structures and its escape into internal cavities.

Contents of phlegmonous abscesses.

Abscesses sometimes contain air.

Phlegmonous abscesses may form in any part of body, but most common in areolar tissue; occur in internal organs occasionally, as lungs, liver, brain, etc.

**Symptoms** of phlegmonous abscess.

**Pointing** of abscess.

**Constitutional** symptoms.

Diagnosis of abscess; necessity of attending to following points:

1st. History of case. 2d. Pointing. 3d. Fluctuation. 4th. Œdema. 5th. Use of exploring needle.

The affections most likely to be mistaken for abscess are encephaloid, aneurism, and hernia.

**Prognosis.**

**Treatment** of phlegmonous abscess.

**Diffuse Abscess, or Purulent Infiltration**, is where the collection of pus is not limited by adhesive inflammation, and is widely diffused among the tissues. Most common in persons of broken-down constitutions and intemperate habits, and in persons suffering under organic diseases; also in severe injuries, contusions, lacerations, compound fractures, dissection wounds, amputations, resections, etc. Very common in scrofulous subjects.

Occur in conjunction with erysipelas, pyemia, or phlebitis.

Symptoms of purulent infiltration—local and general.

Prognosis very unfavorable.

**Indications of treatment** are, to evacuate the matter and support the system.

**Scrofulous Abscess**—often called chronic or cold abscess; strumous or tubercular.

Never met except in a strumous or scrofulous constitution; progress always slow, requiring weeks or months. Is not accompanied by evident symptoms of inflammation, there being neither heat nor redness; there is even a deficiency of circulation; pain also is commonly wanting; the general strength and health gradually decline. Most common in lungs, lymphatic ganglia, and movable joints.

The strumous abscess is nearly always furnished with a cyst, technically called the pyogenic membrane, which characterize it and separates it from surrounding parts; it is a result of adhesive inflammation; its thickness varies from the eighth of a line to the eighth of an inch. Often becomes very dense; adheres firmly to surrounding tissues.

These abscesses are sometimes very large, as in psoas abscess, reaching a gallon.

**Treatment** differs essentially from the phlegmonous.

When strumous abscesses are situated externally, as in the mammary or lymphatic glands, subcutaneous cellular tissue, etc., they should be evacuated promptly as a general rule.

After evacuation, the best local applications are stimulating poultices; tincture iodine internally; injections of dilute tincture of iron or solution of iodine; soap liniment, etc.

In deep-seated, large abscess, as psoas and others, we should be

very cautious in opening them. Many refuse to open them at all; and when opened it should be done by a valvular opening—with a trocar.

### Multiple Abscess, or Pyemia.

**Pyemia** signifies an alteration of the blood by pus, giving rise to what is termed **purulent infection**.

Follows severe injuries, as those of the head, compound fractures and dislocations, lacerated, contused, and gunshot wounds. Not uncommon after labor in females. In erysipelas, carbuncle, small-pox, scarlatina, and typhoid fever; in injuries of veins. Most common in bad constitutions, in the intemperate, and in hospitals and bad air.

The **immediate** causes of pyemia are not determined.

It is supposed by some that pus is absorbed and transferred in large quantity from one part of the system to another; while others contend that pus globules are too large to be absorbed.

The most rational theory, perhaps, is that advocated by Professor Bennett, of Edinburgh, as well as others, which supposes that a peculiar poison is developed in certain deposits of pus, which enters the circulation, contaminates the blood and solids, and produces the train of symptoms that characterize **pyemia**. According to this hypothesis, the corpuscles, as such, do not enter the circulation.

This poisonous matter seems to have the effect of inflaming the capillaries and larger blood-vessels, particularly veins, in which are soon formed deposits of fibrin and pus; and also of developing purulent collections in various distant parts of the system. The veins are often completely blocked up by coagula.

The following example will illustrate the nature and progress of this condition:—

A patient has had a limb amputated or injured otherwise; after a few days the surgeon finds the wound not doing well; the patient complains; the inflammation looks unhealthy; manifests no disposition to heal; the discharge, instead of healthy pus, is a thin, bloody, ichorous fluid; the patient is restless, looks pale, anxious, and alarmed; pulse irritable and frequent; cheeks flushed; secretions deranged. These symptoms may not last more than twenty-four hours, when severe rigors set in, which within an hour or two are followed by high febrile reaction, colliquative sweats, etc. The rigors return frequently at short intervals, and at other times simulate intermittent fever.

The conjunctiva and skin become jaundiced; the features are shrunken; eyes sunk in the sockets; pulse very rapid and feeble;

respiration labored; tongue dry and clammy; thirst urgent; somnolence; stomach irritable; bowels irregular, loose or constipated; urine scanty and high colored; coldness of extremities; delirium; severe pains in muscles and joints; often pains in internal organs, and cough, indicative of implication of lungs; red blotches appear on the joints, indicative of approaching suppuration. Similar marks occur in the course of veins and in other parts; great emaciation. The symptoms go on steadily aggravating till death, the duration varying from three to ten or twelve days.

On dissection, numerous abscesses or purulent depots are found in various organs and tissues, which are called *metastatic* or *multiple* abscesses. They are most common in lungs and liver, then in the spleen, and lastly in brain, heart, and kidneys. I have several times, in lying-in women, seen enormous collections of this kind in the cellular tissue of arms and legs, beneath the skin.

These abscesses are seldom if ever single, and may amount to several hundred, varying from the size of a hemp-seed or pea, up to the size of a quart measure.

These abscesses never contain well-formed pus, but a dirty-grayish, drab, or ash secretion, and composed mainly of a plastic lymph. There is rarely any appearance of inflammation around them.

**Treatment.**—Little need be said on this point, as the disease is always fatal. Stimulants, tonics, and anodynes, are the only indications suggested by the symptoms.

### HECTIC FEVER.

**Hectic Fever** is a peculiar form of fever which never occurs as an idiopathic affection, but is always symptomatic of some particular disease, and is generally connected with the existence of suppuration of some important organ, and more especially the lungs. A striking characteristic is, that it rarely if ever appears until the malady which it represents has made considerable progress. In phthisis, it is seldom seen until the softening of tubercles takes place, and often not until large cavities are formed. On the other hand, we sometimes see large psoas abscesses without hectic for a long time. If the latter be opened and exposed to the air, hectic follows immediately.

One marked difference between hectic and pyemia, is the protracted course of the former, and short duration of the latter.

In traumatic affections, hectic often sets in early.

Hectic may be regarded as a continued, remitting fever, lasting usually as long as its cause continues in action. Although the

fever does not generally intermit entirely, it is subject to distinct paroxysms. Sometimes its course is rapid and violent; at others languid and gradual; sometimes preceded by severe rigors, at others a mere sense of chilliness. Appetite and sleep are impaired; tongue dry, sometimes coated and sometimes red. In a word, hectic resembles all other fevers in its symptoms. Paroxysms followed by copious clammy sweats, principally at night. The paroxysm commonly comes on in the afternoon and lasts some six or eight hours, reappearing about the same hour next day. Often there are two paroxysms in the twenty-four hours, a second coming on at night, or in the morning. The sweating stage, as in other fevers, is accompanied by much relief.

Although much less uncomfortable between the paroxysms, the excitement and disagreeable feelings do not pass off entirely; the countenance is anxious, care-worn, and pale; the eyes have a peculiar sparkling expression, are sunken in their sockets; the teeth are pearly white; emaciation goes on rapidly, although the appetite is often good and digestion apparently healthy.

As it progresses, the tongue becomes very red, raw, and covered with aphthæ; troublesome diarrhœa. The patient is gradually worn out after excessive emaciation, while the mind is clear and hopeful to the last.

The prognosis is usually unfavorable; but in those cases where the cause can be removed, as often happens to the surgeon, this fever promptly disappears—sometimes within twenty-four hours.

The indications of **treatment** are, to remove the cause and to support the system by tonics, diet, and air. The tonics most used are quinine, tincture of bark, iodide, sulphate, and chloride of iron. Night-sweats are met by elixir vitriol, tannin, sponging with stimulants and astringents, etc.

### MORTIFICATION.

By this term is meant the death of a part. The stage immediately preceding the death of a part, or that in which it is gradually losing its vitality, has been called **gangrene**; while the term **sphacelus** is applied to the complete extinction of life. Mortification is therefore a sort of generic term, including the whole process.

Mortification may be acute or chronic, moist or dry. Acute and moist are merely names for the same thing, and so with dry and chronic. Specific mortification is that which arises from the action of a specific poison, snake-bite, chancre, malignant pustule, etc.

Acute mortification may attack all parts of the body, with, perhaps, the sole exception of the heart. The susceptibility of tissues, however, differs greatly. As a general rule, those are most liable to suffer which stand lowest in the scale of organization, and which have little vitality. Fibrous membranes, tendons, ligaments, cartilages, and bones generally perish readily; the cellular tissue is also very liable to suffer. Next in order come the mucous and serous membranes, the lymphatic ganglions, muscles, nerves, and blood-vessels, the latter of which mortify with great difficulty.

Mortification is extremely rare in internal organs; rarely in the lungs, and still more rarely in liver, spleen, kidneys, uterus, ovaries, and brain.

The causes of acute mortification are those of inflammation, and may be thus divided:—

- 1st. Intense inflammatory action.
- 2d. Mechanical obstruction of circulation.
- 3d. Chemical agents.
- 4th. Defect of nervous energy.
- 5th. Constitutional debility.

**Symptoms.**—These are much aggravated when acute inflammation is about to terminate in gangrene; sensibility and pain are increased; redness becomes more vivid; swelling and tension increase; effusion and disturbance of function more marked.

Constitutional symptoms also are aggravated; fever is much increased and accompanied by delirium; pulse rapid; thirst great; great restlessness. In young and robust subjects the symptoms are sthenic; in weak subjects the reverse occurs. Under any circumstances prostration soon occurs, with irritable pulse, surface bathed with cold perspiration, sunken countenance, etc.

The complete death of the part is denoted by the livid, black, or mottled discoloration, by entire absence of heat and sensibility; a peculiar fetid, cadaverous odor, and crepitation on pressure in consequence of chemical decomposition of the tissues. Immediately beyond the seat of mortification the inflammatory action, with its attending phenomena, is seen still going on.

The constitutional symptoms now become very marked.

The **color** of the mortified parts varies in different organs.

The **consistence** also varies.

The **effects** of mortification on the system vary according to circumstances.

In those cases where the powers of the system are sufficient to resist and arrest it, an attempt is made by nature to throw off the dead

from the living parts by ulcerative action, the first evidence of which is seen in the formation of a circle of vesicles filled with sero-sanguinolent fluid. These vesicles burst, and a faint, reddish line is observable, technically called the **line of demarkation**, which is looked for by the surgeon with great anxiety. This process is the commencement of spontaneous amputation, which sometimes proceeds with considerable rapidity.

The skin generally separates first, then muscle, tendon, and aponeuroses, then vessels and nerves, and lastly, cartilage and bone; the latter being detached with great difficulty. Frequently several months elapse before the separation is complete, and then in a very irregular shape; in a limb the stump is conical, with the bone projecting beyond the other tissues.

The discharge during the process is profuse, and extremely offensive.

As the separation goes on, healthy granulations spring up from the raw border, pouring forth an abundant supply of healthy pus.

The manner in which the divided blood-vessels are closed and hemorrhage is prevented, is very curious and interesting. Before the arteries and veins are divided by the ulceration, the blood coagulates within, lymph is thrown out around them, and they become hermetically sealed. This closure sometimes extends several inches.

**Treatment** of acute mortification is to be conducted on general principles applicable to that of inflammation.

In robust subjects, where the action is high, we deplete by bleeding, leeches; use antimonials, saline mixtures; give opium to allay pain, allay nervous excitement, and procure sleep; and apply soothing lotions, cold or warm applications, and poultices; some recommend highly the application of blisters. Free incisions into the sloughing part are useful in relieving tension and discharging pent-up fluids.

After mortification has taken place, when a part of any extent or importance is involved, the local treatment is of little importance; but all the powers of life being depressed, it is important to sustain the system by stimulants, tonics, nourishment, opiates, etc. Quinine, bark, carbonate of ammonia, brandy, wine, and opium, all come into play, and must be used as indicated.

Great cleanliness is important; free ventilation and the use of chlorides; Labarraque's disinfecting liquid is very convenient, sprinkled over the part, the bed; poultices, etc. The yeast poultice, charcoal poultice, and dilute pyroligneous acid are also much used.

The dead slough may be cut away with much advantage from time to time, but care should be taken not to touch the living tissues.

When a clean granulating surface is obtained, it must be treated on general principles laid down elsewhere.

In cases of mortification of the extremities, it becomes a very nice question to determine the circumstances which demand amputation. Should it ever be performed when the mortification is progressing, or should it be performed only after the line of demarkation is established?

It is now a well-established principle, that amputation should not be resorted to in **idiopathic** gangrene before the line is established; and even then, if there is great prostration, it is most prudent to wait until the powers of life are somewhat rallied; but if the strength is sufficient to bear the shock, the sooner the operation is performed the better, after the line is established between the dead and living parts.

The course adopted in **traumatic** gangrene is very different. This is more rapid in its course, and there is often no time for delay. Where the injury of an important artery, nerve, joint, or bad compound fracture is the cause of the mortification, the sooner the amputation is performed the better; nothing can be gained by delay, and a few hours may render it hopeless.

**Chronic or Dry Mortification** is the very reverse of the acute; it is slow in its march and wanting in humidity; the skin is very black, and when the process is complete, looks like a smoked tongue or piece of charcoal.

One of the best types of this form is seen in what is called "senile gangrene," being most common in old subjects. It generally begins in a little bluish or purple spot on the inside of one of the small toes, which is soon followed by a vesicle filled with bloody serum; this bursts, and exposes a cold, black, and insensible surface. The disease spreads from this point till it involves the entire foot, ankle, and even leg. The whole is black, dry, cold, insensible, shrunken, and **without odor**.

Generally it is preceded and accompanied by sharp pains, lancinating in various directions, and particularly at night.

The constitution is commonly much implicated from the beginning; pulse feeble, irritable, and rapid; tongue brown, coated, dry, and tremulous; digestive and other functions all deranged; and the patient dies in from six to twelve weeks, of exhaustion. Few recover from chronic mortification.

**Causes.**—One of the most common is ossification of the arteries, leading to the formation of fibrinous clots within, and obstruction of



the circulation. Sometimes the clot is formed a considerable distance above the seat of disease, as in the popliteal or femoral artery, but generally in the smaller branches.

Ergot, or spurred rye, has been known in France, Switzerland, and Germany, to produce chronic gangrene to considerable extent. It sometimes occurs without assignable cause. It may occur at all ages, but is most common in middle and advanced life.

**Treatment.**—In some rare cases antiphlogistic treatment may be required, but generally the opposite plan is called for. Tonics and stimulants must be resorted to according to indications; wine, brandy, porter, bark, iron, ammonia, opium, etc. Local applications are of little use; tincture of iodine, stimulating poultices, etc., have been advised.

Amputation should not be resorted to till the line of demarkation is formed, and not then until the system is sufficiently rallied. If the operation is performed too soon, the patient sinks from the shock, or the disease attacks the stump.

## HOSPITAL GANGRENE.

**Hospital Gangrene** is a form of disease with which you are not likely to meet, and need not therefore occupy your time in a limited course like ours. It is a variety of mortification, with ulceration, which commits great ravages among the wounded in hospitals and camps in Europe. You will find it fully described in all the systematic works on surgery.

## ULCERATION.

The true nature or process of **Ulceration** has caused much discussion. Gangrene deals with larger masses, while ulceration seems to act on the molecules of the part and may be regarded as a molecular death or destruction of tissues. In ulceration there is first softening, next disintegration of the affected tissue, and lastly, the removal of the dead or cast-off particles; but inflammation is always the first step which leads to the others.

John Hunter believed that absorption was the principal act in the process of ulceration, and this opinion was long held by his successors; it was supposed that the effete particles were thus taken into the circulation and thrown off by the emunctories.

Some structures are far more liable to ulceration than others; for instance, the dermoid and mucous cartilages and bones, lymphatic ganglions, tonsils, uterus, lungs, and kidneys. The fibrous and serous

membranes, the muscles, tendons, vessels, nerves, brain, heart, liver, and spleen, salivary, prostate, and thyroid glands, seldom suffer in this way.

Newly-formed parts, as cicatrixes and callus of broken bones, are easily affected by ulceration, particularly in a vitiated condition of the system. Ulceration is also more common in one part of the same tissue than in another, as in the skin, mucous membranes.

**Common and Specific inflammation.**

**Definition.**—Ulceration varies in the rapidity of its progress.

**Causes** of ulceration are those of inflammation; any kind of inflammation, common or specific, malignant or non-malignant, may cause ulceration; pressure will cause it; and it is often kept up by dependent position.

When the inflammation is of an unhealthy character, runs high and progresses rapidly, throwing off the dead tissues in masses instead of molecules, it is called **phagedenic** ulceration.

The **pain** of ulceration is often peculiar and characteristic of the particular form. Ulceration is always accompanied by the discharge of matter of some kind, and the kind is much influenced by the character of the inflammation; it is healthy or laudable, sanious, ichorous, corrosive, etc.

There is a remarkable tendency in deep-seated ulceration toward the nearest surface, and this is an important law; essential structures are thus saved, and life often preserved by it; abscess of the liver will discharge through the intestine, of the lung through the bronchial tubes, etc.

Progress of ulceration differs according to cause, condition of constitution, tissue involved, etc.

**Treatment.**—Principal indication is to arrest inflammation and bring it to the point of healthy **granulation**. Antiphlogistic treatment. When granulations appear, they must be carefully watched.

## ULCERS.

**Definition.**—A solution of continuity or loss of substance of any surface, external or internal, produced by inflammation and attended by a discharge of pus, ichor, or sanies. Thus we have ulcers on the mucous surfaces of bowels, lungs, bladder, etc., about the mouth and fauces, on any part of integuments, etc.; but when we speak of **ulcers** without any qualification of the term, the surgeon generally alludes to ulcers on the external surface, and more particularly those on the lower extremity, below the knee, where in the great majority of cases they occur, for reasons we shall soon give.

The subject is one full of difficulties, as you may judge from the fact that surgeons differ greatly in their ideas of its pathology, classification, and treatment. Many of the divisions of ulcers are so minute as to confuse the student, and not being based on any fixed principles recognized by the profession, they are unstable, and calculated to mislead. Take up a dozen elementary works on surgery, and you will find scarcely any two to agree, which shows that they are all talking of things they do not fully understand.

All ulcers are the result of **inflammation**, acute or chronic, simple or specific, and must be judged in all cases by the degree, character, and results of inflammation.

The division, therefore, of Dr. Gross, is the most simple, most natural, and in every respect the best for the young student. He divides ulcers into "**acute and chronic**, according to the intensity and rapidity of the morbid action."

Common or simple ulcers are those which are produced by common inflammation, wounds, abrasions, etc. Specific ulcers are those which owe their origin, or at least character, to some specific virus, as small-pox, syphilis, glanders, malignant pustule, schirrhus, encephaloid, tubercle, melanosis, and a variety of animal and vegetable poisons.

**Acute Ulcers.**—The name indicates the character; they are distinguished by severe and rapid inflammation. They usually spread rapidly from a point, generally oval in shape, but sometimes irregular, surface very red and angry looking, or red at one point and covered by white aplastic matter at another. When the action is very high, the bottom of the ulcer exhibits a foul, greenish, brownish, or blackish appearance, without any semblance of healthy lymph; the discharges are profuse, bloody, acrid, and possessing none of the characters of healthy pus, such as is furnished by a granulating wound.

The edges of this kind of ulcer differ much in different cases; in general they are thin, sharp, and undermined; or undermined at one place, straight at another, and, perhaps, everted at a third; sometimes very ragged.

The parts around exhibit all the marks of high inflammation; deep-red color; preternatural heat; œdematous swelling and pitting. The pain is often very acute, and varies much in kind, throbbing, pulsating, gnawing, pricking, dull, heavy, etc.; much aggravated by posture.

Together with the above phenomena there is often much constitutional disturbance, fever, loss of appetite, deranged secretions, etc.

Persons of bad habits, irritable temperaments, those laboring under mental anxiety, exposed to bad atmosphere, are most liable to inflammatory ulcers; rarely seen in children or in the higher circles of society; they are usually diseases of the poor and the vicious.

Acute ulcers may be primary, or one of chronic character may assume this type from various local or constitutional influences; sometimes spreading very rapidly and destroying all the surrounding tissues; in other words, assuming the phagedenic type. Here the molecular death is akin to mortification, both in local and constitutional symptoms.

**Treatment** of acute ulcers must be strictly antiphlogistic, modified to suit the particular case; mercurials where the secretions indicate them, purging, neutral mixture, antimonials, opium to allay pain and procure sleep.

Other cases, instead of antiphlogistics, require tonics, generous diet, stimulants, etc. The history of the case, pulse, constitution, and condition of the patient must guide us.

**Local Treatment.**—This is directed by the general principles already laid down for inflammation. Rest and position are of primary importance; scarifications and the application of warm wet cloths to promote bleeding are sometimes required. Poultices, sprinkled with opium or morphia, give great relief; touching with acid nitrate of mercury, or nitrate of silver occasionally; warm-water dressings; chlorides to correct fetor; charcoal or yeast poultice for same purpose.

Under these remedies inflammation subsides, the ulcer cleans, and granulations appear, and new skin commences forming along the edges of the old. When this stage arrives, the simplest and mildest dressings are best, and if stimulating applications are used they must be mild and watched carefully.

**Chronic Ulcers.**—The exact point at which an acute merges into a chronic ulcer cannot be well defined; and it must be remembered that chronic inflammation may at any time, under certain influences, become acute, and require the treatment of acute inflammation. This is seen well illustrated in inflammations of the eye. Chronic ulcers are peculiarly liable to these changes; for, occurring as they generally do on the lower extremities—in the laboring class and among the intemperate and reckless—they are in the great majority of cases subjected to numerous irritating influences. The term chronic generally includes the idea of **time**, but usually is applied to inflammations of low, sluggish type, whether of long or short duration. In the re-

ceived sense, therefore, an ulcer may be chronic almost from the beginning; may become so in two or three weeks, or as many months. Generally speaking, chronic inflammation is the sequel or result of acute inflammation.

In the chronic form the symptoms become much mitigated, the redness, heat, swelling, and pain all are greatly diminished; the parts are still engorged with dark blood and surrounded by effused fluids; there is no tendency to reparation, and the ulceration often progresses.

Chronic ulcers may exist for months, or even years, advancing, stationary, or receding according to circumstances. Granulations, when they occur, are feeble, unhealthy, and incapable of carrying on reparation without proper aid from the surgeon.

In chronic inflammation the constitutional symptoms are changed, fever disappears, the pulse subsides, and the system, like the ulcer, demands support; and it is clear that the case must be treated in accordance with the general principles already laid down.

Though varying very much in seat, as well as number, shape, size, color, etc., chronic ulcers are most commonly found on the inner surface of the leg, a few inches above the ankle, sometimes on the opposite side, over the joint, or higher up. This choice of position is difficult to explain; there are more veins on the inside, and this is the only plausible reason assigned.

Chronic ulcers differ greatly in size and shape, sometimes round or oval, irregular; sometimes small, at others covering half the leg. In depth, they generally do not reach below the subcutaneous cellular tissue; at other times they involve the fascia, muscles, and even bones and cartilages.

The color of these ulcers varies from pale red to purple or brown, according to the condition of the circulation. The color or degree of vascularity of the surrounding integuments also varies much.

The edges are generally callous, elevated, rather broad and insensible; more rarely they are thin, serrated, and either inverted or everted, and very sensitive; sometimes the edges are undermined; in fact, there exists almost every possible variety, which must be studied in hospital wards to be fairly understood.

The surface of the ulcer is irregular, and more or less below the edges. When there is much inflammation there is an absence of granulations, and the bottom of the sore will be found foul, fetid, bloody, and even phagedenic, or covered with unhealthy lymph, incapable of organization. The discharges are profuse, acrid, sanious, and not presenting the appearance of pus; sensibility often great.

This form of ulcer is often truly chronic, may exist for an indefinite time, and is what authors have called the **inflamed** or **irritable** ulcer; it is most common in nervous, irritable constitutions and the intemperate. Where the inflammation is more languid, granulations of a weak, flaccid character will sprout up, and often high above the skin, requiring to be cut down before healing can commence; they are pale, flabby, and tuberculated. This is vulgarly called proud flesh, and ulcers of this kind have been called **weak** ulcers. Sometimes chronic ulcers are seen with very small florid granulations, irregular in shape and exquisitely sensitive and painful; the discharge is thin, sanious, and acrid; the surrounding skin is much inflamed, and the whole mass looks angry and unhealthy, with irregular edges. Chronic ulcers are often complicated, and kept up by visceral or constitutional disturbance and by local complications of fascia, veins, bones, etc., as well as by bad habits or occupations.

**Treatment.**—The causes or complications are first to be removed; the inflammatory action must be attended to and granulation promoted. The surgeon must view the case deliberately, meet the **indications**, and not look for specifics. Whatever is wrong in the system must be corrected, and the question determined whether the action is **above** or **below** par, and whether tonic or antiphlogistic remedies are needed.

Where the edges are undermined, the shortest way is to cut them off; where the granulations are too high, they must be destroyed by caustics.

Where ulcers are too sensitive to bear compression and are inflamed, a poultice of bread and milk, starch and corn meal, ground flaxseed, slippery elm, or similar soothing materials, afford great comfort, and are the best protection.

When they require stimulating, they may be touched with solid nitrate of silver, or the acid nitrate of mercury; wet with weak solutions of nitric acid, sulphate of copper, the muriated tincture of iron. When the pain is great, a little opium or morphine may be sprinkled on the sore or poultice.

A great variety of ointments have also been recommended, simple cerate, basilicon, red precipitate, etc., and although they often answer exceedingly well, they are less cleanly and less used now than other dressings.

During the whole treatment, the bowels, stomach, secretions, and general condition of the system must be attended to; without this, local remedies are often of no avail.

When healthy granulations appear, the treatment becomes very

simple; here it is that ointments answer best, either mild or stimulating, according to the condition of the sore.

In all forms of ulcer, **elevated position** of the part, and **rest**, greatly facilitate the cure; in the inflamed, and all those which will not bear compression, it is indispensable. There are, however, many chronic, very indolent and insensible ulcers which admit of a modification of this treatment. Among the poor and laboring class, time is too valuable to lose, and among these you often find ulcers which are extremely indolent, and which bear compression well; in such cases by supporting the parts well with a bandage or adhesive straps, or both, the patient may be allowed to go about moderately, and the treatment be successfully conducted.

Manner of dressing ulcers generally—cleansing, changing dressings, etc., use of chlorides.

Propriety, danger, etc., of healing chronic ulcers.

### GRANULATION.

This is the process by which all wounds heal that do not close by first intention or adhesive inflammation, and is the only one by which ulcers can be healed. It is a process of great interest and importance to the surgeon, and should be thoroughly comprehended by the student. Inflammatory action, to a certain extent, is necessary for the formation of granulations, but this inflammation must neither be too high nor too low. When a proper, healthy action is established in an ulcer or open wound, the surface becomes covered with a layer of lymph, which soon becomes organized and converted into florid, fleshy-looking little bodies called **granulations**. Successive layers of deposit go on becoming organized in this manner, until the raw surface is filled up and covered over by a new skin or cicatrix.

The progress of granulations viewed under the microscope is very curious; but this we must leave to the professor of pathology. They are usually very florid, very vascular, very sensitive, and bleed upon the slightest touch; they are conical, rounded, or oval in shape, and not unlike a ripe strawberry or half-ripe blackberry; the blood-vessels are very minute and numerous, forming delicate loops in each point of granulation; they often form with great rapidity; they absorb readily many substances in solution, as opium, arsenic, quinine, etc. I have often allayed pain and procured sleep by the absorption of morphia in this way; atropia applied in this way will dilate the pupils, and strychnia produce its specific effects; and so with other articles.

Granulations also are secreting bodies; they pour out lymph, a part of which goes toward the reparation of the part, and the other to the formation of pus for the protection of the part from the atmosphere, and often to form a protecting scab.

The facility with which granulations form depends upon the structure of the part, the degree of inflammation, condition of the constitution, and other circumstances. Ulcers involving the skin and cellular tissue usually throw them out with great facility; bones, cartilage, tendon, and fibrous membranes, on the other hand, granulate slowly and with difficulty, on account of the less vascularity and deficiency of sensibility, and their injuries are consequently repaired with more difficulty.

Granulations may be quite healthy at one time and the reverse at another, and the change may depend on some derangement of the system, imprudence of the patient, improper dressing, etc.; and the appearance of the granulations are an important guide to the surgeon in his treatment.

Healthy granulations are very small, florid, and sensitive, without pain unless when touched. When unhealthy they become too pale, too dark and congested, too soft, too hard, too sensitive, or too insensible; sometimes they become œdematous; at others too exuberant or deficient.

The character of the discharges from granulations also varies greatly; from healthy granulations we have healthy pus, thick, creamy, of pale-yellowish color. From inflamed or irritable granulations the discharge is thin, bloody, and acrid. In old callous granulations there is generally little or no discharge at all.

In the treatment of granulating surfaces, it is important to protect them from the air, to prevent them from becoming too dry or unhealthy, and thus embarrassing the healing process. Simple water dressings, emollient poultices, or simple ointments, all answer well for this purpose.

#### CICATRIZATION.

**Cicatrization** is the term applied to the process by which the opening is closed and covered over by a new product.

When a wound or ulcer is about to close or heal, it becomes covered over and filled up with healthy granulations; a thin, white layer of lymph is deposited around the edge of the old skin or sound margin; this becomes organized and covered over with epithelial scales; at first it is a very thin, delicate pellicle of whitish or bluish color, easily wiped off; very soon it becomes thicker and firmer, and



assumes a good deal the character of the deficient integument whose place it is to supply. The process thus goes on steadily, new skin forming from the margins, until the whole surface is covered over by a cicatrix.

In the great majority of cases the cicatrix is formed by, or from, the margins of the old skin, and does not form in the central parts of the sore. Many surgeons assert that this is always the case; but there are, unquestionably, occasional exceptions, where patches of skin or cicatrix will form on the central granulations, entirely independent of the integuments.

It requires some time for the cicatrix to become firm; it makes a very good substitute for the true skin, but is never identical in structure. It has a tendency to contract, to crack or break, and ulcerates again or inflames from more trifling causes than the original skin. An old scar on a horse's back is the first point to become sore under the saddle.

The same remarks apply to other tissues than the skin; except bone, there is scarcely an example where a tissue is repaired by material identical with the old.

Cicatrixes are sometimes attacked by the epithelial form of cancer, keloid, ill-conditioned ulceration, etc.

#### SOFTENING, INDURATION, TRANSFORMATIONS, HYPERTROPHY, ATROPHY, CONTRACTION.

These are terms frequently met with, and should be understood by the student; they are the result of excess, deficiency, or perversion of nutrition.

**Softening**, or, as the French call it, **ramollissement**, is often a result of inflammation, and may occur in almost any organ or tissue. It is characterized by a want of that natural firmness or solidity which belongs to an organ in its normal state, and varies much in degree, from a slight loss of consistence to a state bordering on fluidity. The lungs, brain, spleen, liver, heart, mucous membrane of alimentary canal, articular cartilages, and spongy portions of bones, are points of its attack. Softening may take place rapidly or slowly, and has therefore been divided into acute and chronic. It depends mainly upon the vascularity of the tissue and the acuteness of the inflammation.

The cause and nature of softening are often difficult to understand; interruptions to the supply of blood, or nervous influence, are sometimes evident causes.

**Induration** is usually one of the events of inflammatory action, and is the result of the deposition of lymph in the substance of an organ; its interstices are filled up; it becomes harder and heavier; the lymph may be absorbed and removed entirely, or may become organized and give rise to permanent induration.

It is very common, and may occur in any of the tissues; lungs, bones, uterus, subcutaneous cellular tissue, and glandular system are most liable.

Differs greatly in extent, degree, consistence, persistence, rapidity of formation.

Greatly impairs the structure and functions of organs.

**Treatment** of induration.

**Transformations of Tissues.**—Some of these in the young and growing are normal; those of the adult are abnormal.

The most important changes to the surgeon are the—

Cellular;

Mucous;

Cutaneous;

Fibrous;

Calcareous;

Fatty.

**Hypertrophy.**—This term is applied to the enlargement or increased size of an organ. True hypertrophy is not usually a diseased but a healthy process, the result of an attempt of nature to compensate for some defect of action, although other examples have been admitted. The causes assigned are inordinate exercise of an organ, mechanical obstruction, and chronic inflammation.

Examples of each.

**Atrophy** is a term, on the contrary, applied to the wasting or diminution of an organ.

Causes, nature, examples.

**Contraction and Obliteration.**

Synonymous with stricture.

Nature, causes, symptoms, etc.

## TUMORS.

From the frequency of their occurrence, their great variety, and their important relations, local and constitutional, this class of affections is one of great importance to the surgeon.

A tumor may be defined "a circumscribed mass, growing in some tissue or organ of the body, and dependent on a morbid excess or deviation of the nutrition of the part." It increases in size by an inherent force of its own, independent of the structure of the part in which it grows.

Tumors are divided into two great classes, viz., **non-malignant** and **malignant**. The boundary between the two cannot be clearly defined, and a **simple**, under certain circumstances, may degenerate into a **malignant** tumor. We therefore have another term in use, the **semi-malignant**, to designate the intermediate condition. The non-malignant, simple, innocent, or benign tumors are strictly **local**, and resemble more the normal textures of a part, and are therefore called **homomorphous**. They usually grow slowly, and are more or less distinctly circumscribed, being often inclosed in a cyst, and have no tendency to involve surrounding structures in their own growth; they simply affect the other tissues by their size and pressure.

There may be one or more; when removed they have no tendency to return, and when left alone often attain large size.

The truly malignant tumors differ in toto from the benign. They seem to depend on some vice of the constitution, or if local in the beginning, they soon involve the system. They are characterized also by much greater activity in their progress than innocent tumors. They commence at a point from an unknown germ or cause, are developed by an inherent force of their own, irrespective of the surrounding tissues, and produce a mass which differs entirely in appearance and structure from any normal tissue in the body, and hence called **heteromorphous**. This mass may be confined in a cyst, or infiltrated in the texture of some organ, and usually increase with great rapidity.

Malignant tumors also have the peculiarity of *involving the surrounding tissues without showing any well-defined boundaries*, and soon implicate other organs through the lymphatics or blood. If removed, they return either in the same site or in some distant part of the system. If left alone, they march steadily on, increasing in size, ulcerating, destroying the tissues around, and causing death by the local injury, implication of other organs, and constitutional disturbance.

Malignant tumors are usually cancerous in their nature; but malignant and cancerous are not synonymous terms; every malignant tumor is not cancerous, though every cancer is malignant. Some cartilaginous, fibro-plastic, and other tumors become malignant, and return when removed, although to the naked eye or the microscope

there is no cancerous structure visible. I have seen cases of this kind repeatedly, where I was unable to decide upon the probable issue. This malignant termination or degeneration of apparently innocent tumors probably depends upon some peculiarity of the individual.

**Non-malignant** tumors may be arranged in three classes;—

1. Encysted tumors.
2. Tumors dependent on the simple increase of size of already existing structures in the tissues or organs in which they occur; for instance, fatty tumor in adipose tissues, exostosis in connection with bone, etc.
3. Tumors dependent on the new growth of already existing structures in situations where they are not normally found; as for instance a cartilaginous tumor in the midst of cellular tissue, or a fibrous tumor under a serous membrane, etc.

**Encysted Tumors** may be divided into—1st. Those dependent upon the gradual accumulation of a secretion in a naturally existing duct or cyst, with dilatation and hypertrophy of its walls. 2d. Those that result from the new formation of a closed cyst in the cellular tissue of the part and the destruction of it by the secretion from its lining membrane. Examples of the first are seen in encysted tumors of skin and cellular tissue formed by sebaceous follicles from closure of their ducts; in the sublingual and mammary glands from same cause; and those formed by the retention and modification of the secretions in cysts without excretory ducts, as in the bursæ.

Encysted tumors arising from the obstruction of the excretory ducts of the sebaceous glands include the various forms of **atheromatous** tumors on the surface of the body, on the scalp, neck, face, back, etc.; they vary much in size; very common in the eyelids; sometimes very numerous in the same subject.

Symptoms, anatomical characters, progress, diagnosis.

The treatment is **removal**.

Other forms of encysted tumor may arise from the closure and dilatation of the ducts of other excretory organs, as ranula, encysted hydrocele, in the testicle, female breast from lacteal ducts.

**Cysts** from the distention of cavities unprovided with ducts are numerous, as bursæ; these vary much in size, structure, and appearance. Cysts are sometimes new formations; simple and compound, or multilocular cysts. Contents; treatment.

Encysted tumors containing **hair, teeth, fatty matters, etc.**; remains of blighted fœtus; they are congenital.

Tumors from the simple growth of tissues are quite common. They comprise those—1st. Connected with the integumental structures, as warts, polypi, etc. 2d. Lobular hypertrophies, with more or less modification of glandular structure, as in the breast. 3d. Fatty tumors. 4th. Vascular tumors. 5th. Tumors of nerves. 6th. Tumors of bones.

**Warts, condylomata, keloid.**

Treatment.

**Elephantiasis.**

**Polypi.**

**Hypertrophy** of glandular structures, as lymphatic glands, lymphatics, testes, etc.

**Fatty tumors.**

**Fibro-cellular tumor.**

There is another class of tumors depending on the new growth of structures identical with, or very closely resembling normal tissues, in situations where they *are not normally found*.

This class includes many innocent growths, but some that are semi-malignant. The **fibrous, fibro-plastic, and the enchondromatous** tumors are those chiefly met with.

**Fibrous tumors** occur in various parts of the body, but are not so common as many other forms; they are irregularly oval or rounded, smooth, movable, painless, slow in growth, but may attain large size. When cut into they exhibit a fibrous structure; they often remain stationary for years, but finally undergo disintegration, soften and break down, ulcerate and slough; they throw out fungous growths, suppurate externally, and bleed, and finally wearing out the powers of life.

The **semi-malignant** often resemble these very much, and have been termed malignant fibrous, recurring-fibroid, fibro-plastic, and the enchondromatous.

Malignant fibrous tumor.

Fibro-plastic or myeloid tumor.

Recurring-fibroid tumor.

Enchondroma, or cartilaginous tumor.

Symptoms, structure, etc. of each.

## CANCER.

This is essentially a malignant growth, has a tendency to return when removed, implicates surrounding structures, and if not consti-

tutional in its origin, soon involves other organs and the whole system.

Cancer differs from all normal structures by being a new product, never under any circumstances existing in the healthy system, and possessing laws and organization peculiar to itself.

Cancer presents itself in four or five forms so different in appearance, in rapidity of growth, in consistence, color, and structure, as at first sight to appear to constitute essentially different diseases, but yet having so close a family resemblance, and presenting so many points in common, that, physiologically and pathologically, they must be considered as mere varieties of the same disease. The varieties of cancer generally admitted are **schirrhus**, or hard cancer; **encephaloid**, or soft cancer; **colloid**, or gelatinous cancer; **melanosis**, or black cancer.

Symptoms, progress, structure, etc. of each.

Diagnosis not always easy.

Causes of cancer.

Treatment of cancer—caustics, excision, etc.

When to be operated on.

#### Epithelial Cancer—Epithelioma.

In what does it differ from other cancers?

Where found usually.

Treatment—caustics, excision, etc.

### SCROFULA.

**Scrofula**, **struma**, **tubercular disease**, are synonymous terms, and are applied to a peculiar condition of the system, which soon or late ends in the deposition of a peculiar matter called **tuberculous**, in some one or more organs or tissues. There is, perhaps, no tissue in the body exempt from its ravages; its most common forms of manifestation are pulmonary consumption, chronic enlargement of the glands of the neck and other parts, hip-joint disease, psoas, lumbar, and other chronic abscesses connected with bones and joints, follicular ulceration of mucous membranes, arachnitis, otorrhœa, ozæna, ophthalmia, eczema, etc.

The striking characteristic of scrofula is the deposition of tubercular matter, but still a strumous disposition of the system may exist giving rise to various derangements of organs, or the system generally, without reaching the point of tubercular deposit.

It is now generally conceded that scrofula and phthisis are the same disease, the different forms depending solely on the **structure**

attacked. The tubercular matter found in a lung, bone, or gland is the same. Tubercular disease not only occurs at all periods of life, but is most frequently hereditary. When it attacks the lungs it is most common between the twentieth and fortieth years. In children it is most common between the third and tenth year. Children suffer little from phthisis, and adults comparatively little from external scrofula. The disease rarely occurs in any form in those advanced in life.

The children of consumptive parents often suffer with scrofulous diseases of bones and joints, lymphatic glands, eye, ear, serous membranes, skin, etc.

Attacks whole families; sometimes skips a generation or two.

**Tubercular deposit.**—Its characters and mode of deposit.

**Causes of tubercular disease.**

Scrofulous or tubercular deposit is always accompanied by inflammation, but of a low and peculiar kind.

**Duration**—indefinite.

**Symptoms.**—Excessive emaciation of all the organs; blood is altered, thin and deficient in globules.

Not contagious.

The **strumous diathesis** is declared by certain external, as well as internal signs; it presents two physiognomies.

In one the complexion is brunette: hair more or less dark; pupils large; upper lip tumid; face pale and puffy; hands and feet disposed to be cold; body sensitive to changes of temperature; muscles weak; intellect sluggish; appetite capricious; digestion irregular; bowels loose or bound. Children of this type particularly prone to scalp eruptions, enlargement of tonsils, and discharges from ear.

In the other form a very opposite condition of mind and body is seen: complexion very fair and florid; eyes blue; hair blonde or red; mind precocious and very active; cutaneous circulation active. In this form of struma, the bones and joints, eye, skin, lymphatic ganglions, are the parts most liable to suffer; phthisis being more rare than in the dark variety.

**Scrofulous Ulcer.**—Common on skin; best marked in lymphatic glands; its characteristics are——

**Treatment of Scrofula.**—Depends much on the individual case and peculiar state of the system; at one time antiphlogistics; at another tonics.

Mercury, iodine, iron, quinine, cod-liver oil, purgatives, diet, clothing, exercise and air, travel.

Local treatment; their uses and abuses.

## SYPHILIS.

This disease may very properly be studied in connection with scrofula; for although there are many striking points of contrast, still they both are very chronic in their march; both pervade the whole system and attack nearly every tissue in it; often their symptoms are so blended, that a diagnosis is difficult to form, particularly in the osseous, glandular, and cutaneous system. Syphilis, too, is generally much more intractable in scrofulous subjects; and it has been contended that syphilis in one generation is the parent of scrofula in succeeding ones.

Syphilis commences as a sore, called chancre, of a specific character, and, except in rare instances, about the genital organs. The next step is in the lymphatic glands of the groin; then the cutaneous and mucous surfaces, and finally the bones, cartilages, and fibrous tissues, on all of which its mode of action is peculiar. The action is first local, and if arrested here the other organs escape. If not arrested in from four to six weeks, the cutaneous and mucous surfaces show signs of disease, and, at a still later period, from six to eighteen months, or longer, the bones, cartilages, and fibrous tissues are attacked. To these three stages, or periods, the names of **Primary, Secondary, and Tertiary Syphilis** are generally applied.

Syphilis is peculiar to the human race, and cannot be communicated to animals by inoculation. The disease never arises spontaneously, but is propagated by a specific poison from one individual to another. A chancre may be produced on any part of the body by inoculation with a lancet. The pus, or matter of a chancre, has nothing in it peculiar to the eye.

The virus acts much more certainly and rapidly when applied to a raw surface. When applied to a sound surface, several days elapse before any effect is seen, and often no effect is produced. No matter how applied to a surface, the effect may follow, and surgeons and accoucheurs should be very cautious how they touch.

## PRIMARY SYPHILIS.

As stated, this is the first stage, and includes chancre and bubo. So far, the disease is local, and the matter contagious. When it passes on to the secondary and tertiary stages, it is no longer communicable by inoculation, though transmissible to the offspring through either the father or mother.

**Chancre.**—Its first symptom is a little red speck; it next becomes elevated into a small papula, surrounded by a faint rose-colored cir-



cle; about the third or fourth day, the papula assumes the form of a vesicle, the cuticle being elevated by a little thin, whitish matter, and the inflammation around increases. This stage lasts but a day or two, when the vesicle is transformed into a pustule, or filled with pus, the center being depressed. From the fifth to the sixth day, a remarkable and characteristic change occurs; the tissues under and around the sore become infiltrated with fibrin, indurated, and, when grasped between the fingers, feel like a mass or ball of fibro-cartilage. This is the mature stage at which the chancre secretes the infectious virus. At about the sixth day, the pustule begins to turn dark; a firm, thick scab forms, stratified and somewhat conical. If the scab is removed, a large, deep ulcer is seen, of an excavated appearance, as if scooped out with a punch. The edges are steep and ragged; the bottom incrustated with a grayish aplastic lymph, and its base hard. The discharge is generally thin, sanious, or ichorous, without any property of healthy pus. This is what is called an **indurated**, or **Hunterian chancre**, and is the form considered most dangerous and certain to infect the system.

Chancres are most common on the glans penis and prepuce, particularly beside the frænum, the vulva, surface of vagina, and neck or mouth of uterus; sometimes also attack urethra.

It is rarely we have an opportunity of watching the stages of a chancre, which is usually presented to the surgeon as an open sore.

Although the above described form is agreed upon by all as an unmistakable syphilitic sore, and by many is regarded as the only true infectious form, still most writers mention two forms, viz., the **indurated**, and **non-indurated** or **soft chancre**; all other divisions are untenable, as the tissue attacked or state of the system give character to other forms, and not different kinds of virus.

Ricord, the great French authority, asserts that there are two distinct syphilitic poisons. The **indurated** chancre alone, he says, is the infecting ulcer; that is, capable of secreting a fluid which can contaminate the system in a manner to produce secondary and tertiary symptoms. The **non-indurated** chancre he regards as a purely local affection. Though the indurated chancre is most infectious, still the broad ground assumed by Ricord is not yet generally received. It is believed by many, that the soft chancre often produces all the constitutional effects of the indurated. Syphilitic bubo is believed never to arise except as a consequence of chancre. The indurated chancre is rounded or oval, varying in size from the eighth to half an inch or more; the induration is greater when it is seated

on the glans, than on the prepuce, and lasts for some time after the sore has healed.

The indurated chancre is usually solitary; is indolent, has little discharge, and almost always affects the inguinal glands.

The **soft chancre** is irregular in form, generally round or oval, and often two, three, or half a dozen exist at the same time; they occur most frequently at the free margin of the prepuce, or around and behind the corona glandis. They often occur in succession, as if from the erosion of the discharge from the first one. The surface of soft chancre is superficial, flat, uneven, and coated with a dirty whitish, or ashy deposit of unhealthy lymph; sometimes it has a ragged or worm-eaten appearance. When seated on the glans, the edges are perpendicular, as if cut out with a punch; when on the prepuce, the edges are ragged, irregular, and often overhanging or undermined. The base of the ulcer is free from induration, except when irritated by caustics.

This form of chancre has a tendency to spread, particularly in persons of bad constitution or habits; often becoming phagedenic. The discharge is copious and quite infectious; it frequently, but not generally, is followed by bubo, the disease usually limiting itself to one ganglion; this inflames readily, and suppurates; forms a large, ugly ulcer, secreting the same kind of infectious matter, which, by inoculation, is capable of producing another soft chancre. Though less likely to attack the system than the indurated chancre, there is abundant reason to believe that the matter is absorbed and produces all the constitutional symptoms of the other form, both secondary and tertiary.

Ricord believes that the true indurated chancre can occur in the same individual but once; this is doubtful, but the soft chancre may occur any number of times.

Writers have described a great variety of chancres, but they are all modifications of the two forms noticed, by peculiar circumstances or constitutions; all grades of inflammation, from the mildest up to sloughing, are seen in different subjects, just as happens in common ulcers on the legs.

Gangrene more often attacks the prepuce and skin than the glans; sometimes the whole penis sloughs off.

**Diagnosis** of chancre is sometimes difficult or impossible in the early stages; ulcers from other causes are often confounded with it, and we must, to a great extent, be guided by the history, until

some distinctive characteristic is developed. The non-syphilitic sores disappear in a few days if kept clean and simply dressed, without constitutional treatment.

The non-specific sores rarely affect the inguinal glands; if they do, it is within a few days, while the specific sore does not before the end of the third week. The point may always be determined by inoculating the patient on the thigh with the matter.

**Treatment.**—The first point is to prevent if possible the absorption of the virus into the system. This is what is termed the **abortive** treatment. If the specific character of the sore can be destroyed before the end of the fifth day, the constitution will be saved, as the disease, thus far, is purely local. To attain this object, some surgeons direct the chancre to be cut out; others prefer escharotics; some recommend the nitrate of silver to be well applied. The acid nitrate of mercury, or a drop of pure nitric acid, is more reliable. Care must be taken to protect the surrounding parts. After this, a poultice should be applied till the slough falls off. The patient should be kept quiet, purged, and dieted.

If we are called too late for the abortive treatment, which may be tried (if there is not much inflammation) as late as the seventh or eighth day, other means must be resorted to. If there is much inflammation, soothing, and not irritating remedies must be used.

Cleanliness is of first importance. Washing with warm water; poultices; if the sore is under the prepuce, it should be syringed out with warm water, lead-water, weak solution of white vitriol. When the ulcer is beneath the prepuce, and the latter can be drawn back, it is all-important that lint should be constantly interposed, and the latter may be kept wet with the black wash, a weak solution of tincture of myrrh and water, zinc, tannin, or any very mild astringent; the most important part of the dressing is the lint and cleanliness; if there is pain, the watery solution of opium answers well. After the sore becomes less sensitive and requires a little stimulation, the yellow wash, made by putting one or two grains of corrosive sublimate to an ounce of lime-water, is a very good application.

Chancres, like other sores, when chronic, require occasional change of dressings. When they begin to granulate, the simplest dressings are best. It is often indispensable, when there is much inflammation, that the penis should be kept elevated and at rest.

**Constitutional Treatment.**—The diet and bowels must be regulated, as well as the general condition of the system. If there be an

indurated chancre, mercury should be resorted to at once, and continued till the gums are touched or the sore gives way, unless some condition of system forbid. If there is fever it must be met by antiphlogistics in all the forms required, as bleeding, purging, antimonials, recumbent posture, anodynes, poultices to the part, cooling lotions, etc. In the phagedenic form, antiphlogistics and opiates must be freely used, but mercury never, as it acts as a poison. In this form, if the mild and soothing applications do not arrest the disease, solutions of the nitrate of silver, muriated tinct. Ferri, or acid nitrate of mercury, become necessary to change the action.

**Gangrene** must be managed agreeably to the state of the system, according as the action is too high or too low. The local remedies are the same as for other cases of gangrene.

When the **chancre** is indolent, it requires the application of caustics and other stimulating articles.

The **indolent chancre** often leaves behind, when heated, an indurated base, which remains for an indefinite time; this is always dangerous, as the system may still become contaminated as long as the induration lasts. Here the use of mercury is indispensable.

Calomel the most certain form; manner of using it; other forms of mercury.

In the primary forms of syphilis, calomel and blue mass are generally preferred, as more prompt and reliable in action than the bichloride, iodides, and other preparations. It may be regarded proper that mercury should not be employed in any form of primary syphilis if there be fever. The system, under such circumstances, must be cooled down and prepared for it by purgatives, salines, antimonials, diet, etc. Nor should mercury ever be used in phagedena, or gangrene, or when there is marked irritation, local or constitutional. Mercury in syphilis is a two-edged sword, that has done much more harm than good in unskillful hands.

Syphilis is often cured in its primary and secondary forms without mercury, and many practitioners never give it. A great many statistics can be adduced to show that syphilis may be cured in a short time, and as thoroughly, without as with mercury; but there is still great diversity of opinion on the point. One fact is certain, that the action of mercury, in some constitutions affected by syphilis, is productive of the most terrible effects.

Where phymosis complicates chancre, it should not be touched by the knife if it can be avoided. Frequent injections of tepid water

should be resorted to, together with occasional astringent washes, until the inflammation subsides. If no progress can be made in this way, the prepuce must be slit open to the bottom on a director, and the edges cauterized, to prevent infection of the cut surfaces.

Where paraphymosis exists, it should be reduced as soon as possible with the aid of chloroform, and if this cannot be done, the stricture must be divided and the wound covered with collodion.

**Bubo.**—This is a term applied to an enlargement of one or more of the lymphatic glands of the groin: it is produced by different causes, all of which have a tendency to inflame those glands—over-fatigue, jumping, gonorrhœa, sores or injuries about the lower extremities, as well as chancres or other sores on the penis, may all produce this affection. These swellings are most likely to occur in young and in scrofulous subjects.

The syphilitic bubo differs from all these in being a **specific** disease, the result of the absorption of a peculiar virus, and in reproducing chancre by inoculation of the matter taken from it after it suppurates. Up to this point the disease is called primary, and is local.

The syphilitic bubo rarely occurs under about fifteen days from the first appearance of the chancre, although there are exceptional cases in seven or eight days, or at the end of four or five weeks.

Bubo may be the result of either the soft or indurated chancre. The indurated chancre is almost always followed by bubo, and involves several ganglions, which become indurated somewhat like the original sore. This form of bubo has little tendency to suppurate, though sure to contaminate the system soon or late.

The soft chancre, on the contrary, is only occasionally followed by bubo; it attacks usually but one gland and runs its course rapidly, terminating in an abscess, the matter of which is infectious.

Some believe that a bubo may occur without previous chancre, but such cases must be extremely rare, and few surgeons believe in its possibility.

Buboes are sometimes hard, very chronic, and resist treatment with great obstinacy. In other cases they become rapidly and highly inflamed, and run quickly to suppuration. In this form there is fever and much constitutional disturbance, with severe local pain. The pus should be evacuated early; if allowed to extend and ulcerate, they form large, ragged, angry, unhealthy-looking abscesses, burrowing under the skin, and sometimes sloughing extensively. The true bubo is always situated above Poupart's ligament, while the non-specific one is situated below.

**Treatment of Bubo.**—In the first stage, we should attempt the abortive treatment by iodine applications, and compression, with rest; if this fail, some surgeons recommend deep cauterizing over its center, or blisters. When suppuration threatens, it should be hastened by hot poultices, and as soon as pus is formed, it should be evacuated by a free incision in the direction of Poupart's ligament. Poultices should follow the opening for a few days, and if the ulcer is disposed to become chronic, it must be stimulated by nitrate of silver, dilute tincture of iron, or iodine, etc. In the mean time the state of the system must be attended to.

### SECONDARY SYPHILIS.

This term is applied to the next group of symptoms which follow the **primary** just described, and usually appear in from five to eight weeks after the appearance of the chancre. The skin and mucous membranes are the structures most liable to these phenomena, and may be attacked simultaneously or in succession, and one may be attacked and the other escape. Secondary syphilis is always the result of chancre, though not necessarily of bubo; the latter symptom is often wanting where the worst forms of tertiary and secondary syphilis are manifested.

There has been much discussion on the point, whether secondary symptoms follow any other than the indurated chancre.

The secondary symptoms often occur before the primary have disappeared. The skin, mouth, and throat may show eruptions, tubercles, ulcers, etc., while the chancre still exists, or bubo. On the other hand, these symptoms are seen long after the primary ones are gone, and the patient supposes himself well.

The indurated chancre is almost invariably followed by constitutional symptoms, and the longer the chancre remains uncured, the less chance of escape. Delicate and strumous constitutions are most likely to suffer from constitutional effects, and the chancres and buboes are here most difficult to heal.

Dr. Gross, like many others, believes that secondary symptoms are more likely to occur where mercury has been used in the primary stage.

When the local inflammation runs very high, absorption is less likely to follow.

Transmissible by parents to the children.

Secondary symptoms usually ushered in by well-marked constitutional disturbance, **syphilitic fever**, etc.

Secondary syphilis shows itself under the following forms, when it appears on the skin, viz., **exanthematous**, **scaly**, **vesicular**, **pustular**, **tubercular**, and **papular**, which have been termed **syphilides**. The three last appear later than the others, and belong more properly to the tertiary train of symptoms.

Syphilitic eruptions are chronic in their course, are more or less circular in form, and always exhibit a characteristic copper hue, especially in their earlier stages; later, they exhibit a dirty brownish or bronze, or ashy color.

These eruptions, though occurring in all parts of the body, are most conspicuous generally on the forehead, nose, cheek, back, breast, shoulder, inside of arm and thigh, and are followed or attended by thin, grayish scales; hard, thick, greenish scabs; narrow, superficial cracks, or well-marked ulcers.

These eruptions are usually easily distinguished by the history; by their connection with other syphilitic symptoms; by the copper color of the surface, and by the absence of itching.

#### Characteristics of the **exanthematous form**.

"	"	<b>scaly</b>	"
"	"	<b>vesicular</b>	"
"	"	<b>pustular</b>	"
"	"	<b>tubercular</b>	"
"	"	<b>papular</b>	"

**Treatment.**—Importance of attending first to the febrile and other constitutional symptoms, before any specific remedies are employed. Purgatives, antimonials, Dover's power, etc. are in the great majority of cases sufficient without resort to mercury, and the iodide of potassa is most appropriate to the tertiary symptoms.

There are other symptoms belonging to the secondary train of phenomena, viz.:—

**Alopecia.**

**Cervical Adenitis.**

**Affections of Mucous Membranes.**

Characters of each of these.

#### TERTIARY SYPHILIS.

This is a term applied to a still deeper grade of the disease than secondary syphilis, in which the poison seems to pervade the blood and every tissue in the system; and it may be well doubted whether

the constitution is ever thoroughly cleansed of the virus when the disease reaches this form ; it not only shows itself through life in the individual in some form, but the children of such subjects almost always bear the marks of it.

The boundary between the secondary and tertiary forms cannot often be well defined. Those symptoms which occur within the first five or six months after the first primary symptom are usually denominated **Secondary**, and those which occur later, **Tertiary**; the latter being developed usually at from six to eighteen months, though not unfrequently occurring after the lapse of many years.

The skin, mucous membranes, periosteum, bones, fibro-cartilage, aponeuroses, tendons, and testicles are the structures most liable to suffer from tertiary syphilis, although all others may be involved.

Tertiary syphilis need not necessarily be preceded either by secondary or bubo, but always by chancre.

Tertiary symptoms are more likely to occur in those cases where mercury has been injudiciously used or abused, and such cases are generally the most unmanageable and distressing we have to meet.

Influence of diathesis, habits, etc. on the development of constitutional symptoms.

**Syphilis of throat and mouth, characters of.**

“	nose,	“	“
“	larynx,	“	“
“	eye,	“	“
“	skin,	“	“
“	osseous system,	“	“
“	testicle,	“	“
<b>Condylomatous growths.</b>		“	“

**Treatment.**—This is much better understood of late years, and when not advanced too far, tertiary syphilis may generally be cured; and where not curable, our remedies have great control over the symptoms, and contribute greatly to comfort.

The **iodide of potassium** is the great remedy on which we are here to rely, and to a great extent it certainly is entitled to the name of a **specific**, and its use need rarely be preceded by any preparatory treatment.

There has been much dispute about the proper dose of iodide of potassium, but from six to ten grains will be found sufficient in almost all cases, given three times a day in some bitter infusion or simple water, or sarsaparilla. In most cases, where twenty, thirty, or more



grains are given, it deranges the stomach, excites the system, etc. It is best to produce a gradual alterative effect, and there is no truer maxim than the one that "*a chronic disease requires chronic treatment.*"

Another important direction in the administration of iodine is, to give it as much as possible on an empty stomach, and well diluted; if we give it in a gill, or still better, half pint of water, an hour before breakfast, an hour before dinner, and at bedtime, the effect will be much more certainly attained than if it is thrown into the stomach while loaded with food. The fact is well known to physiologists, that many articles may be detected in the urine in twenty minutes after being taken into an empty stomach, and much later and less certainly, if taken during digestion. The same rule, I am certain, applies to all articles designed to act through the blood.

The degree of toleration for this remedy differs greatly in different subjects; it may continue for weeks, or even months, with the occasional omission for a few days. In many cases the effect of this remedy is greatly enhanced by the moderate use of the bichloride of mercury; they may be combined and given together; the eighth to the sixteenth of a grain of the latter three times a day. The mercury should be continued moderately for some weeks unless it salivates too much.

Where the bichloride disagrees with the stomach, blue mass may be used with Dover's powder, and in some cases, where there are troublesome skin diseases, painful nodes, etc., Donovan's solution answers a good purpose.

Fumigation, inunction, baths, tonics, sudorifics, anodynes, sarsaparilla.

Onychia,	}	Treatment.
Syphilis of the nose,		
"    "    larynx,		
"    "    iris,		
"    "    bones,		
"    "    testicle,		
Condylomata.		

SYPHILIS IN THE INFANT.

The disease may be inherited from either parent, or the child may be inoculated by the mother during labor.

A chancre on the mouth of the child may communicate syphilis to the nipple of the nurse; or chancre on the nipple to the child.

There is no good reason to believe that secondary symptoms can be communicated from one to the other.

## WOUNDS.

**Definition.**—Any solution of continuity in a tissue, by cutting, or pointed instrument, or any blunt substance.

Divided into—

- Incised wounds.
- Lacerated or contused wounds.
- Punctured wounds.
- Gunshot “
- Poisoned “
- Penetrating “

Wounds of regions.

**Complications of wounds.**—Hemorrhage; foreign bodies; abscesses; mortification; erysipelas; pyemia; and tetanus.

**Mode of dressing wounds.**—Adhesive plaster; sutures; bandages; pins; collodion.

**Mode of healing wounds.**—There have been described five processes by which wounds are supposed to heal:—

1st. By **immediate union**, or the direct growing together of the raw surfaces.

2d. By **scabbing**, or the formation of a crust of blood covering over the wound.

3d. By the effusion of lymph, and the conversion of this into fibro-cellular tissue.

4th. By **granulation** and the development of epithelial matter.

5th. By the junction or inoculation of granulations with each other.

The doctrine of Hunter was, that there were but two processes, viz., healing by “*first intention*,” or adhesion through the interposition of lymph; and healing by granulation, or “*second intention*.”

Description of each of the above processes.

### INCISED WOUNDS.—(Definition.)

There are always present effusion of blood; more or less pain; and retraction of the edges.

**Hemorrhage**—Capillary, venous, arterial; color of the blood; arterial pulsation.

**Pain** depends upon the tissue implicated; injury of nerves, etc.

**Retraction** depends also upon the tissue wounded; condition and age of patient, etc.

**Treatment.**—The first indication in an incised wound is to arrest hemorrhage. This is effected by exposure to the air; cold ablution; compression; styptics; and ligature.

The next indication is to cleanse the wound thoroughly of all foreign substance, coagula, etc.; then the cut surfaces must be applied together with perfect accuracy, and so retained by proper supports, rest, and position. If the wound is small, adhesive plaster will usually be sufficient; if large, sutures, pins, bandages, etc. are required.

Process by which the union takes place.

If secondary oozing of blood, or undue inflammation occur, the union is retarded or prevented.

Lint, wet with simple cold water and steadily applied, will combat the inflammation better than any other application. If suppuration supervenes, change to warm poultices or warm-water dressings.

#### LACERATED WOUNDS.—(Definition of.)

These wounds differ from the incised—in the less degree of pain; in their exemption from hemorrhage; in their tendency to inflammation, suppuration, and sloughing; and in their liability to be followed by tetanus and other nervous and constitutional symptoms.

The absence of pain at the time of injury and soon after is attributable to the violence done to the nerves. When full reaction, however, takes place, after the effects of the shock wear off, violent pain often sets in and requires large doses of opium.

The absence of hemorrhage is attributable to the injury done the vessels and the mangled condition of the tissues enveloping them.

Process by which the bleeding is arrested by the efforts of nature described.

**Treatment** of lacerated wounds must be guided by same general principles as the incised. Hemorrhage, if present, must be attended to; wound thoroughly cleansed; surfaces brought nicely together; ragged edges trimmed off; adhesive straps, bandages, etc. applied. Much of the wound may not heal by first intention, but it is still proper to get all adhesion you can in this way, as there is less left to be done by granulation, and time is saved.

Water dressings, either cold or warm, as most agreeable to the feelings of patient, should be steadily applied.

The general condition of the system must be attended to; fever

combated; opium given freely to relieve pain and procure rest, etc.

Secondary hemorrhage—how treated; tetanus.

#### CONTUSED WOUNDS.—(Definition.)

Their gravity depends upon their extent, part affected, and violence of the cause. The sensibility of the part is deadened, and there is generally little pain, till swelling and inflammation set in.

**Shock.**—Its symptoms, importance, treatment. Tetanus and neuralgia sometimes follow, and, like in lacerated wounds, there is little hemorrhage. There is danger of secondary hemorrhage when sloughs separate, from fifth to tenth day. In gunshot wounds particularly the danger is great.

Contused wounds suppurate freely; often slough and form abscesses, and give rise to erysipelas.

Some of the worst forms of contused wounds are those produced in deep-seated parts without injury to the skin, by cannon balls, heavy weights, wagon-wheels, etc.

You may have a **contusion** without a wound, as a "black eye" from the fist, etc., in which there is discoloration from extravasation of blood; this is termed **ecchymosis**.

**Treatment.**—Indications are, to arrest hemorrhage; to combat inflammation; and promote absorption of effused blood.

There is little prospect of healing by first intention, but it is nevertheless proper to put the parts as much as possible *in situ*, and retain them there, so as to allow nature to do all that can be done in this way. After arranging the parts properly by straps, sutures, bandages, etc., it is well to apply simple warm-water dressings, and, after a few days, lotions or poultices, a little stimulating and tonic.

The general health must be attended to, opiates given when demanded, and when granulation comes on, stimulating ointments will be found useful.

#### PUNCTURED WOUNDS.—(Definition.)

They of course differ very much in gravity, according to their position, depth, extent, and parts implicated.

The *pain* of punctured wounds is usually excruciating, from the injury done to nerves, they being lacerated, or partially torn, and not crushed, as in contused wounds. The pain after inflammation sets in is also severe; the degree of suffering depends much on the nature of the inflicting instrument: a nail, splinter, or rough body of any kind, gives much more pain than a smooth one, like a knife, trocar, etc. Punctured wounds are particularly dangerous among fibrous

tissues, as in soles of feet and palms of hands, dense fascia, etc.; tetanus and deep-seated abscesses being common consequences.

Punctured wounds are rarely attended by hemorrhage. The shock is sometimes very great. They are peculiarly liable to be followed by erysipelas, angeioleucitis, **abscess**, contraction of limbs, and wasting of muscles.

**Treatment.**—First remove any foreign substance; arrest hemorrhage if present; prevent inflammation; and quiet the nerves. The finger is the best probe where it can be used.

**Detection of needles**, and mode of extraction; importance of their removal by incision at once.

When there is deep-seated hemorrhage, it may become necessary to cut down and tie the artery to prevent the formation of aneurism, or other effects; artery to be tied on both sides of the injury.

Poultices must be used; anodynes internally and locally; and it often becomes necessary to make free incisions where there is inflammation and swelling, or pus formed below fascia.

#### TOOTH WOUNDS.

The gravity of the symptoms following wounds inflicted by the teeth of animals is usually much more marked than that of wounds to the same extent inflicted by other causes; and there is good reason to believe that the saliva of all animals is more or less poisonous. The bites of dogs, cats, rats, etc., and more particularly when inflicted on the hands or feet, where the structure is complicated and fibrous tissue predominant, are often followed by intense inflammation of an erysipelatous character, which results in deep-seated suppuration, sloughing, inflammation of lymphatics and veins, etc. The bite of a man, I believe, is the most poisonous of all, and I have had not only to amputate fingers, but an arm or two, for injuries inflicted by human teeth.

**Treatment** consists in simple emollient applications, rest, anodynes, and attention to the state of the system.

#### GUNSHOT WOUNDS.—(Definition.)

Danger dependent on parts involved, extent, etc.

Injuries inflicted by small shot, powder, wadding, bullets, cannon balls, shells, splinters, etc.; percussion caps.

Gunshot wounds partake of the nature of contused and lacerated wounds. The wound is *small* and contused at entrance of ball, and larger, and lacerated at exit. When the missile is large, there is more or less sloughing.

**Irregular course**, particularly of *spent* balls; ball sometimes comes out at the opening by which it entered.

Balls often become encysted and remain for years without injury.

**Windage of balls.**—Pain often insignificant; injury of nerves.

**Hemorrhage** generally not in proportion to the severity of the injury; not likely to be serious at first except when large arteries are implicated; artery more likely to bleed from partial, than complete division; artery often, when struck, escapes injury from its elasticity; hemorrhage *external* or *internal*.

**Secondary hemorrhage** very often follows gunshot wounds, from separation of slough; occurs usually from the tenth to fifteenth day, but sometimes sooner or much later.

**Constitutional symptoms**, shock, etc.

**Prognosis.**

Causes of death are shock, hemorrhage, tetanus, pyemia, erysipelas, gangrene, profuse suppuration, and hectic fever.

**Remote effects.**

**Treatment.**—The indications are—

- 1st. To promote reaction and rally the patient.
- 2d. To arrest hemorrhage.
- 3d. To extract the ball and other foreign bodies.
- 4th. To remove loose bone.
- 5th. To combat inflammation, fever, etc.

When powder is buried in the skin, it should be picked out, to prevent inflammation and discoloration; the parts should be well washed and wet cloths applied.

#### AMPUTATION AFTER WOUNDS.

The decision of the surgeon must be governed by the extent of the wound, the parts involved, age, habits, and constitution of subject.

Wait for **reaction** before operating.

What kind of injuries demand amputation imperiously? Those badly complicated.

#### MAGGOTS IN WOUNDS.

Most common in hot weather and foul wounds. But preventives are cleanliness; covering the wound from flies with bran; and the use about the wound of turpentine, camphor, creosote, and chlorides.

#### POISONED WOUNDS.

Under which head we include those inflicted—1st. By venomous insects, snakes, scorpions, etc. 2d. By rabid animals. 3d. By inocu-

lation from glanders. 4th. Dissection wounds, from examination of dead bodies.

**Wounds of Insects.**—Symptoms, treatment, etc.

**Wounds by Serpents.**—Effects—dependent much on quantity of poison inserted.

**Symptoms.**—Immediate and severe pain; swelling to great extent in a short time, with mottled appearance from extravasation of blood.

The patient soon becomes pallid; vision confused; nausea and vomiting; fainting fits; clammy sweats; coldness, and great prostration.

**Treatment.**—Though a thousand specifics have been recommended, we have no reliable remedy. Persons bitten by *small* snakes, as the “ground rattlesnake,” rarely die under any treatment.

The wound should have a ligature tied above it immediately, if on a limb, to keep the poison from entering the circulation; it should be sucked with the mouth, or scarified, and have a cup applied, and it is well to excise it entirely. Professor Brainard, of Chicago, recommends a solution of iodine to be injected into the wound and surrounding cellular tissue; but unfortunately, such remedies, if really useful, cannot be obtained in time for successful application.

Whisky, ammonia, and other stimulants, pushed with vigor, seem in many cases to have saved life, and appear to act by sustaining the depressed powers until the effect of the poison wears off.

Bibron’s antidote, consisting of bromine, bichloride of mercury and iodide of potassium, to be given internally. The experiments of Dr. Hammond and others are highly favorable to its curative effects.

**Wounds by Rabid Animals.**—These cause a peculiar disease termed **hydrophobia**.

The poison resides in the saliva. How produced and propagated.

Communicated readily by animals, but not certainly by the bite of a rabid man.

Period of **latency**—from a few weeks to several months. The majority of those bitten escape.

Hydrophobia occurs in all latitudes; most common in cold or temperate climates, and rare in the tropics.

**Symptoms.**—The wound generally heals kindly. When the period of incubation has passed, the part begins to burn, itch, become sore and irritable; hot, numb, or rigid, with pains darting in various directions; sometimes a red line is seen along the lymphatics.

Together with these, local, constitutional symptoms are soon developed; the patient feels badly; is restless and sleepless; has frightful dreams and headache; is melancholy and depressed; occasional rigors. The poison now being fairly at work, explodes in a train of violent symptoms in some ten to twenty hours. A dread of water, and difficulty of swallowing, become very prominent symptoms.

In attempting to drink, the patient is suddenly seized with spasm in the throat, and inability to swallow fluid; all attempts are vain, and he pushes the cup aside with horror. He is tormented with thirst, and if he succeeds in forcing down a little water, is seized with choking and suffocation. There is a sense of constriction of the throat and chest; oppression; sighing; spitting of thick, frothy mucus incessantly; symptoms are all aggravated, or paroxysm brought on by a current of air from window or door, or even a fan. Light and noise are both disagreeable; mind peevish and fretful; imagination becomes perverted; imagines sounds, etc.; looks wild; often becomes delirious; screams, and gesticulates like a maniac.

The duration of the attack is from eighteen hours to a week; symptoms become aggravated all the while; the patient is gradually worn out; is seized with convulsions, in one of which he usually expires.

**Prognosis, treatment, etc.**

**Symptoms of rabies in the dog, are——**

**Average period of incubation, forty days; minimum, about two weeks; maximum, three months; causes, unknown.**

Has no dread of water, but drinks freely and often.

#### GLANDERS, FARCY, OR EQUINA.

**History; symptoms; treatment, etc.**

#### DISSECTION WOUNDS.

**History; symptoms; treatment, etc.**

#### MALIGNANT PUSTULE.

**Symptoms; history; treatment, etc.**



## DISEASES AND INJURIES OF THE SKIN, CELLULAR AND ADIPOSE TISSUES.

These constitute a class of affections which it is convenient to group together, and among the most important of them, in the eye of the surgeon, is

### ERYSIPELAS.

It is either idiopathic, or forms a complication of other affections or injuries. It is a peculiar inflammatory affection which was supposed to attack the skin and cellular tissue alone, but is now generally believed to extend to other structures, and particularly the mucous and serous membranes. There are many forms of the disease, giving rise to several divisions by authors; but the best division is that of **simple**, **phlegmonous**, and **œdematous**; some have added to this, **gangrenous**. It is all the same disease in *degree*, and modified by peculiar constitutions, habits, etc.

It is said to be idiopathic or traumatic, according as it is or is not developed by injury.

Most frequent in foul atmospheres, crowded lanes, hospitals, camps, etc.

May occur in any part of the body; the **idiopathic** type most common about face, scalp, neck, or trunk; while the **traumatic** is most common in the extremities. Injuries of scalp, tendons, and aponeuroses often give rise to it in bad form.

Erysipelas sometimes assumes the **epidemic** type.

There are strong reasons for believing it to be **contagious** in its aggravated forms; may certainly be inoculated or communicated to a wound by a sponge used in the disease.

**Causes.**—Certain articles of diet; derangement of digestive organs; intemperance in drinking and eating; suppressed secretions; bad air; frequently supervenes on wounds, particularly the lacerated, gunshot, poisoned, bites of animals, etc. Some child-bed fevers are probably from erysipelas of uterus, uterine veins and appendages.

Its effects on **wounds**—prevents adhesions.

“ **ulcers, chancres**, etc.

The **varieties** are as follow :—

**Simple Erysipelas** is the term used to designate that form which is confined to the skin.

**Symptoms**—a bright, almost scarlet, color of the skin; pungent, burning pain; feeling of thickening and stiffness, with here and there small vesicles filled with serum. There is very little swelling, and not much constitutional disturbance, unless it covers a large surface. The attack is of short duration usually, and is followed by desquamation of the skin of the affected part.

**Phlegmonous Erysipelas** is a disease of much graver character than the simple. There is great constitutional disturbance, and the inflammation attacks the subcutaneous tissues, forming extensive abscesses, sloughs, etc.

The color is more purple; there is great swelling; pain is violent and throbbing, with great heaviness, stiffness, and numbness; and extensive vesication soon takes place. The abscesses burrow deeply and widely, not only destroying extensively the cellular tissue, but muscles and tendons. Extensive sloughs sometimes follow, and the constitution is worn out with typhoid symptoms and prostration.

**Oedematous Erysipelas.**—This variety depends upon the accidental complication of serous effusion into the cellular tissue. Most common about the eyelids, scrotum, prepuce, vulva, and lower extremities of debilitated individuals. There is much swelling, but little pain or discoloration; the surface looks glassy, and pits readily. There is usually much constitutional disturbance, and gangrene is more apt to result than abscess.

**Erratic** is a term used to designate that form of erysipelas in which the disease travels rapidly, and jumps from one part to another.

#### **Anatomical Characters of Erysipelas.**

In the milder grades there is simply a slight thickening and engorgement of the skin, with effusion of serum, in the subcutaneous cellular tissue. In the phlegmonous form there is deep-seated and ill-conditioned suppuration, with destruction of the cellular tissue, and ordinary products of unhealthy inflammation.

**Constitutional Symptoms.**—The external disease is preceded by malaise, headache, loss of appetite, lassitude, rigors, fevers, etc., for some twenty-four or thirty-six hours. The constitutional symptoms then all become much aggravated; fever often runs high, of typhoid character, and there is great prostration; the tongue becomes dry and dark, and delirium is of very common occurrence. In the milder forms of the disease there is very little constitutional disturbance.

**Diagnosis** generally easy; can only be confounded, in its mild form, with erythema.

**Treatment.**—Being the result of so many causes, and appearing in so many different grades and forms, the treatment must necessarily vary according to circumstances; in fact, remedies of the most opposite character are demanded by different cases.

Authors tell us much, in the **constitutional** treatment, about the virtues of blood-letting, emetics, purgatives, antimonials, and other antiphlogistic treatment; but I confess that I have made little use of these remedies, and however they may be demanded in colder latitudes, they rarely find a place in the treatment of this disease as it presents itself in this part of the world.

If a case of inflammatory form, where the symptoms should justify it, should call for it, we might bleed and give antimonials; an occasional dose of **mercury** may be given when the tongue is furred, and the liver not acting well; but this remedy should be cautiously administered, and ptyalism carefully avoided. Gentle **purgatives** may be used when clearly indicated by the state of the bowels. A light emetic of ipecac. may be given with advantage when the stomach is loaded or foul. The stomach and digestive organs being always an important point, if not the real seat of the disease, they must be attended to properly without being over-irritated.

When purgatives are given, a dose of calomel and rhubarb, or blue mass followed by oil, will be best.

**Diaphoretics** are useful, and particularly Dover's powder, as anodynes are generally called for in this disease. Neutral mixture, or citrate of potash, with a little morphine added, answers well; tincture of aconite in three-drop doses, where there is much heat of skin and arterial excitement, may be given with advantage every three or four hours.

**Anodynes** form a very important class of remedies in the treatment of erysipelas—there is, perhaps, no form of disease in which they produce such good effects: a pretty full dose of opium, say two grains, or half a grain of morphine, about twice in twenty-four hours, seems to answer best.

Even when there is delirium, opiates act well, quieting delirium and promoting sleep, as in **delirium tremens**.

The morbid action in this disease differs from that of true inflammation; in those cases where delirium has formed a prominent symptom, dissection shows no marks of true inflammation in the brain or its membranes.

**Stimulants** and **tonics** are often demanded even in the early stages.

Carbonate of ammonia, quinine, brandy, wine, porter, ale, with broth, are to be used when there is a tendency to depression, even with a hot and dry skin, dry tongue, and rapid pulse. Milk-punch is a convenient form of stimulant.

The mineral acids, and muriated tincture of iron are also recommended, and the latter article particularly, when the stomach will bear it, is of late much resorted to, and I think with the best effects, in doses of fifteen to twenty-five drops every six hours. By some its action is regarded as specific.

**Local Remedies.**—Of these an infinite variety have been recommended, which proves that we have really no *one* very reliable remedy. Where a remedy like quinine is much used by the profession, and exhibits specific properties, it is soon generally adopted. If it be true, as many believe, that the cutaneous eruption is merely an external sign of internal or constitutional disorder, our main reliance must be placed on internal remedies, and external ones be regarded merely as adjuvants.

**Leeching** has been recommended, but is applicable to a small proportion of cases.

**Iodine**, in the form of tincture or solution, is one of the most popular remedies of the day, and I believe most useful. The tincture, or Lugol's solution, diluted with an equal quantity of water, may be applied about twice in the twenty-four hours, with a brush or feather, over the inflamed surface and on the margin of the sound parts.

**Nitrate of silver**, either solid or of the strength of one or two drachms to the ounce of water, is preferred by many, acts much in the same way, and I think is about of equal virtue. Like iodine, it should be applied over the diseased and surrounding sound skin.

Pure **creosote**, strong solution of **sulphate of iron**, **lead-water**, **chloride of soda**, **British oil**, (which is a favorite remedy with Professor Gibson,) and many other astringent and stimulating articles have been recommended.

**Mercurial ointment** has been much used by some, but is certain to salivate when applied about the face.

In slight cases, dusting the part with flour, starch, arrow-root, etc., often affords much relief from the itching.

Where there is much tension or suppuration, free **incisions** give much relief—it is a remedy not to be neglected. When the swelling is from serum alone, a number of small punctures with a lancet will answer well. A **bandage** smoothly applied often gives much comfort.

## FURUNCLE, OR BOIL.

This is an inflammation of peculiar character of the skin and subcutaneous cellular tissue.

**Cause**, unknown, but generally connected with some peculiar state of the system or blood. The inflammation results in suppuration and sloughing of the involved cellular tissue. Boils are so common, that it is useless to give a minute description of the symptoms, etc. They take from three to eight days to ripen. When mature, they discharge a **core**, which is the slough of cellular tissue.

Where there is a tendency for many to form at the same time or in succession, it becomes necessary to attend to the condition of the system. A mercurial purge or two; attention to the diet, and the use of sarsaparilla and iodide of potash, will be found the best general course; in warm weather, I have found the free use of lemonade useful.

Little can be done toward arresting their course after they commence; the application of tincture of iodine has been recommended. The best treatment usually is repeated hot poultices and an early opening by the lancet.

Where boils occur in a debilitated condition of the system, as after typhoid fever, small-pox, etc., tonics, fresh air, good diet, sea-bathing, etc. must be resorted to.

## ANTHRAX, OR CARBUNCLE.

This malady is little more than a mammoth boil, being identical in anatomical characters, and distinguished mainly by its size and disposition to spread.

It may occur on any part of the body, but is most common on posterior part of the trunk, and particularly on nape of neck. Is far more frequent in old, and very rare in young subjects; the intemperate in eating and drinking, and those of gouty or otherwise vitiated constitutions, are the most common subjects. The size of carbuncles varies from that of a filbert to that of a saucer, the most frequent size being about that of the palm of the hand.

Of the immediate **causes** we know little, but, like erysipelas, it seems to be more a constitutional than local malady.

**Symptoms.**—At first there is a little burning point of pain, with an erysipelatous-looking spot of redness, with hardness and tenderness. The pain soon becomes greatly aggravated, with much throbbing, and a sense of burning heat as if in contact with heated metal.

The swelling extends around and beneath, and becomes exceedingly tender to the touch; the part becomes very hard, as if the skin and parts below were hardened and glued together; the surface becomes of a dirty, congested red, and at its center vesicles form, containing a dirty, sanguinolent serum; upon bursting, these vesicles expose honey-comb openings in the true skin leading down to the cellular tissue, which is in a sloughing condition. These little ulcers discharge a dirty, ichorous fluid, but no genuine pus. If the part be cut into, the skin is dense and hardened; the dead cellular tissue resembles a mass of wet tow, bathed in ill-formed pus, with flakes of lymph or matter like curds or putty. When the disease is extensive, the muscles, tendons, and aponeuroses become involved; there is much deposit in the surrounding areolar tissue, rendering it very dense.

The **constitution** soon sympathizes, and a train of symptoms, resembling closely those described in erysipelas, appear: rigors, low fever, dry, foul tongue, great debility, derangement of digestive organs, tendency to delirium, etc.

When of large size, and particularly when seated on the back of neck, in old subjects or those of bad constitution, this disease is full of danger.

**Treatment.**—It is of first importance that the general system should be looked to. Moderate purging is required to cleanse the **primæ viæ**, after which tonics and good diet are usually called for, as quinine, ammonia, brandy, ale, tincture of iron, etc. Anodynes too, in full doses, are indispensable to procure relief from pain, and sleep.

Numerous local remedies have been recommended, as iodine, nitrate of silver, etc.; but they are of little value, as they do not reach deep enough to touch the disease. The best local remedies are hot poultices and free incisions; a bold crucial incision should be made across the whole extent of the hardness, and down to its very bottom; in a day or two strong caustics may be applied, as vegetable caustic, chloride of zinc, acid nitrate of mercury, etc. The dead tissues should be cut away as fast as they become partially detached. After the sloughs have entirely come away, any simple dressing will answer; basilicon ointment, dry lint, etc.

## BED-SORES.

This, in low types of fever, in fractures, and other conditions where the patient is long confined to bed, is a frequent and very trouble-

some species of gangrene of the skin. The most common seats are the sacrum and trochanters, which have to sustain the most prolonged pressure; persons paralyzed by injuries of the spine are peculiarly subject to this form of gangrene.

Patients long confined to bed, and particularly those affected with paraplegia, should be carefully watched, as not unfrequently considerable sloughs form before they are suspected even by the patient.

The cases are usually preceded by some local symptoms of burning, redness, inflammation, etc., like gangrene elsewhere; they differ in extent, from very small to very large and deep sloughs, with ulceration.

The old proverb, that "an ounce of prevention is worth a pound of cure," is peculiarly applicable here. Much has been said about hardening the parts, as a preventive, by the application of tannin, alum, iodine, etc.; but the great point is by proper padding to keep the pressure of the body off from the part in danger. The parts should be kept perfectly clean, and the posture of the patient frequently changed; an air or water bed is of great value in such cases, where it can be procured, and great relief may be afforded by air-cushions and well-adjusted pads of hair or wool. Simple water dressings, with the addition of astringents, are the cleanest and best.

## BURNS AND SCALDS.

These injuries differ from each other simply in one being the product of moist, and the other of dry heat. They are presented to us in every possible grade, from a slight blush of the skin to the entire destruction of a part. Another important difference is in the extent, and these differences influence greatly the prognosis and the treatment.

Many divisions of burns have been made, but the simplest arrangement is the best, as they merely differ in degree; that of Dr. Gross answers all practical purposes, viz., "the **simple** and the **complicated**; comprehending under the former term those lesions which, however extensive, produce only inflammation, and under the latter, those which cause the death of the parts, either on the instant, or within a short time after their infliction."

In the mildest forms of burn there is simply an erysipelatous blush, with smarting, stinging pain; the duration may be very short and pass off without any visible sign, or, when a little more severe, may be followed by desquamation. In neither form is there any consti-

tutional disturbance, except when a very large surface is involved, and even then it is of short duration.

The application of heat, when more intense, whether dry or moist, unless sufficiently powerful to disorganize the part, is followed by the development of vesicles filled with serum. When slowly developed, they are sometimes filled with a thick albuminous material, like that often seen after a fly-blister. These vesicles differ greatly in number and size in different cases, according to the intensity of the heat, sometimes being very small and scattered, while in other cases large masses of cuticle are detached followed by a profuse drainage of serum.

The surface around the vesicles is swollen, very florid, exquisitely painful to the touch and even to the air; the pain is peculiarly pungent, which is quickly followed by swelling and throbbing; severe constitutional symptoms soon arise, proportioned to the gravity of the injury and the peculiar temperament of the subject.

We say that a burn is **complicated**, when the vitality of the part is destroyed, or it is accompanied by fracture, dislocation, or other injury. The disorganization may be confined to the skin, or extend to all the soft parts beneath.

The intensity of the burn depends upon the length of time, as well as the manner in which the part is exposed, as fire, molten metal, boiling oil, soap, hot water, steam, etc. Some fluids contain more heat, or are more adhesive than others.

The constitutional symptoms are generally violent and distressing. A very superficial burn, when covering a large surface, may produce great constitutional disturbance—greater often than a very severe burn confined to a small surface; and you must be careful not to make light of an extensive burn, however superficial it may be.

The immediate shock to the constitution is frequently severe and even fatal, reaction not taking place. Besides intense pain, the pulse is very rapid and feeble; nervous system greatly depressed; surface cold, with chilly sensations; nausea and vomiting, with extreme anxiety and distress of countenance; respiration oppressed, etc.

When reaction takes place fully, there is high fever, with tendency to delirium, etc. The brain often suffers greatly, showing on dissection inflammation of the meninges; and there is not unfrequently diarrhœa with ulceration of the bowels.

It sometimes happens that there is little fever, even in severe burns, for some days or even weeks.

You have all seen examples of the frightful scars left by burns—the consequent unnatural adhesion of parts; distortion of limbs and



other parts; stiffness of joints, etc. These scars have a tendency to contract long after healing is complete, and to increase the deformity.

**Treatment.**—The indications are—1st. To relieve suffering and promote reaction. 2d. To combat inflammation. 3d. To detach the sloughs when they occur, as soon as possible, and promote granulation. 4th. To prevent contraction of cicatrixes and ankylosis of joints. 5th. To sustain the powers of the patient, in protracted cases.

The first indication is best met by a full dose of opium, and, if need be, brandy, ammonia, warm applications, sinapisms, etc. Opium is borne well, and less than from sixty to one hundred drops of laudanum in an adult will be of little service, or one grain of morphia.

For the purpose of allaying inflammation and giving relief, an infinite variety of remedies have been recommended, and it is not only true that no one of them is reliable in every case, but different applications seem to suit best different subjects. One is most relieved by cold, another by warm applications, etc. The main indication seems to be, in local applications, *to protect the burned surface from the atmosphere, and to do this by the mildest and most agreeable means*; hence most of the remedies recommended for recent burns act on the same principle and fulfill the same indication: cotton, flour, molasses, lime-water and linseed oil, cloths wet with cold or warm water, and other mild lotions, poultices of various kinds, as bread and milk, flaxseed, elm, etc. These applications have to be varied frequently as the feelings dictate, and their temperature must also be governed by the same rule.

A favorite remedy with Professor Gross, and one I have used with benefit, is the *carbonate, or common white-lead* paint; it is softened with linseed oil to the consistence of cream, laid on lightly with a soft brush, and then covered with cotton and bandage; if there is not much discharge it need not be changed for several days.

It is well known that many poisonous drugs, as arsenic, mercury, morphine, etc., are absorbed into the system and produce their specific effects. Fears have been expressed that the carbonate of lead, like others applied to raw surfaces, might produce deleterious effects; but experience teaches the contrary. Dr. Gross mentions one case of a negro with an extensive burn on neck and chest, in which he used a quart of the lead in five weeks without any bad effect. It would seem to produce its good effects by forming a protective coating, and by its soothing, sedative influence; the relief is sometimes immediate and decided.

Where there is incipient gangrene, or the burn has existed some time, and a stimulating remedy is wanting, the Kentish ointment, made

in the proportion of an ounce of basilicon ointment to a drachm of oil of turpentine, has enjoyed a high reputation; or, instead of this, the part may be penciled with nitrate of silver, about a scruple to the ounce of water. Dilute acid nitrate of mercury, tincture of iron, nitric acid, and many other stimulants, meet the same indication of rousing the dormant energies of the part; stimulating poultices or water dressings may then be applied.

During the whole course, the condition of the system must be carefully watched and indications met.

In order to prevent adhesions, as the fingers and other parts, lint should be interposed between the denuded surfaces, and splints should be applied.

In order to prevent the contraction of fingers, arms, legs, etc. during and after the formation of cicatrixes, splints must be kept applied even long after the healing is complete.

Where deformities from contraction do occur, and the cicatrix is narrow, we sometimes correct them by dividing them with a bistoury; where they are large, they are sometimes benefited by dissecting them out, and placing the neighboring sound skin over the wound and making it adhere. If every portion of the inodular tissue is not removed, no benefit will be derived from such operations; the contraction will be certain to recur.

### FROST-BITE AND CHILBLAIN.

From protracted exposure to cold, and particularly if the patient approaches too suddenly the fire, symptoms of frost-bite, or the after effects of chilblain, are the consequences.

Where a part, as the toes, fingers, ears, etc., has been exposed to cold until almost or quite frozen, if suddenly warmed, mortification is sure to follow; it is therefore best to rub them with snow or pounded ice, immerse them in cold water, use frictions, and restore the heat in the most gradual manner possible. But such cases are so rare at the South, that they do not demand much of our attention.

**Pernio** or **chilblain** are secondary effects of cold, and differ much in degree, from a simple erythema to ill-conditioned ulcers, or even gangrene. The slighter forms of chilblain are not uncommon in the higher classes of society, and particularly among those of luxurious and indolent habits.

They are usually preceded by slight vesication and burning, tingling sensations; these symptoms may continue for a considerable time, or disappear, returning in a less degree from time to time, and

giving a good deal of annoyance; sudden changes of weather may bring on attacks, and the parts become red or purplish, swollen, painful, and œdematous; little vesications often occur, with insupportable itching and tingling.

Ill-conditioned ulcers sometimes occur, involving the fibrous tissues, and are tedious and difficult to heal. **Gangrene** is usually a primary and not secondary effect of cold, and must be treated on the general principles already laid down.

**Treatment** of chilblain is often troublesome and unsatisfactory. A variety of remedies have been recommended; those of slightly stimulating character seem to answer best. In the milder forms immersion in cold water often affords prompt relief, and afterward applying laudanum and water; alcohol and water, or, what is often best, dilute tincture of iodine or solution of nitrate of silver; sometimes cotton, or spirits of camphor give relief.

There are other forms of affections of the skin which come properly under the domain of surgery, among which we shall allude to those which you are likely to see. They are

### SEBACEOUS TUMORS.

These consist of the enlargement of a sebaceous gland or follicle, with the retention of its secretions, and have been designated by the names **encysted**, **atheromatous**, **meliceric**, **steatomatous**, and **follicular**, and even **wen**.

Formed by the closure of the orifice or excretory duct of the follicle; the gradual accumulation of the secretion, and enlargement and thickening of the sac; the size varying from a pea to that of an orange.

The **contents** are very variable, both in color and consistence; generally thick and whitish, resembling lard or tallow; sometimes resembling honey, putty, flour and water; and sometimes hairs are found in them, and also calculous matter.

The **cyst** differs much in thickness; has little vascularity, and its development is very slow and unaccompanied by pain. Sometimes, when of long standing or irritated, it ulcerates and forms troublesome sores.

These tumors are more or less globular, and usually very movable. They are most common on the face, forehead, and scalp, but are not unfrequently seen on the neck, eyelid, shoulder, scrotum, back, or buttock.

The **number** varies greatly: sometimes solitary; often five or six,

and sometimes as many as one or two hundred, scattered over the body.

The **diagnosis** is generally plain. These tumors are characterized by slow growth; insensibility; soft, doughy feeling; spherical form; mobility; subcutaneous position; absence of enlargement of the veins; and normal appearance of the skin.

**Treatment.**—The only remedy is excision, and it should be thoroughly done; unless every particle of the cyst is removed, it may return. When the tumors are on the scalp, they are very easily relieved; a single incision enables the surgeon to turn the whole mass out with great facility. In other parts, the best plan is to make an incision down through the sac; turn out the contents; seize the edge of the sac with forceps, and with the point and handle of the scalpel turn it out. If the integuments are inflamed or ulcerated, it is often best to remove a part by elliptical incisions.

### MOLLUSCOUS TUMORS.

These are a singular form of tumor, which derive their name from their resemblance to the knots on the bark of the maple. When fully developed, they are about the size of a ripe currant, with a central depression on the surface. They differ in form: some are round or oval; some elongated; others pedunculated, etc. They are usually red, reddish brown, or yellowish; soft and spongy.

These tumors occur in various parts of the body, and may exist in immense numbers. They are sometimes seen in several members of the same family. Most common in adults.

Their progress is sometimes very rapid, the surface of the body being sprinkled over with them in a few weeks. Of the exciting causes we know nothing, they being the result of inflammation of the sebaceous glands; the sebaceous matter being secreted too rapidly to escape through the natural channels, bursts them open, presenting a lobulated appearance.

When not interfered with, they ulcerate, the contents are discharged, and they heal. They sometimes slough, leaving ugly scars. Sometimes they become atrophied, and form little wart-like excrescences.

They may be easily removed by the knife or touching with caustics; or tincture of iodine is usually sufficient. Cleanliness must be preserved, and the general health attended to.

### MOLES.

These are congenital marks occurring on various parts, and usually of little importance, except from the disfiguration they cause when appearing on the face or other exposed parts; they are dark, gray, brown, or black, and mostly covered with hair. They are generally a little elevated above the surface, more or less hard, and varying in shape and size—usually not more than three or four lines in width.

When irritated by friction or otherwise, they sometimes produce troublesome ulcers. The best mode of treating is to excise them, and draw the edges together to prevent a scar. Sometimes they are best removed by a fine ligature.

### HYPERTROPHY OF THE SKIN.

A morbid growth of the skin sometimes takes place on different parts of the body, forming projections more or less pendulous. They sometimes produce deformity, or inconvenience from their position, and the only remedy is excision.

### ELEPHANTIASIS.

This is a hypertrophy of the skin and cellular tissue. It is common in the East and in the West Indies, but rather uncommon in this country.

Its most frequent seat is the leg, where it produces a hideous deformity, giving rise to a strong resemblance to the leg of an elephant, whence its name. It occurs also on the scrotum, pudendum, and prepuce, which attain a very large size. In the latter situations it sometimes weighs many pounds—occasionally as many as a hundred.

**Causes.**—Of these we are ignorant, and the pathology is equally obscure, though there is reason to believe that the lymphatics are the seat.

**Dissection.**—The epidermis is very much thickened, rough, irregular in surface, and firmly adhering. The true skin is thickened, hard, whitish, striated, cutting like bacon rind; often from one-fourth to half an inch in thickness; the papillæ are enormously enlarged; the areolar tissue is changed in character, and becomes so infiltrated with fibrin as to look like an inelastic fibroid substance. The muscles below are pressed upon and wasted, pale, and in a state of fatty degeneration. The blood-vessels are much enlarged, and the extirpation is attended with profuse hemorrhage.

Elephantiasis is irregular in its progress, coming on sometimes rapidly, at others very slowly, and always without any known cause; sometimes a blow or other injury seems to be the exciting cause; so with cold water, where the patient has been much in the habit of standing in it. In the early stage the symptoms are inflammatory, the parts being hot, tender, and red; there is also effusion into the subcutaneous tissues, with pitting, hardness, and redness of the lymphatic vessels and glands. There is also fever.

The **diagnosis** is so clear that it cannot be confounded with anything else. The chronic march of the disease, the remarkable development and deformity of the part, and the peculiar condition of the skin, will prevent it from being confounded with anasarca, the only lesion to which it has any resemblance. The disease will continue for life, giving little pain, and little inconvenience except from its weight, stiffness, etc.

**Treatment.**—There is little reliance, I think, to be placed in anything but the knife, and when in a position to render this justifiable it should be resorted to.

### KELOID TUMOR.

This is an affection of the skin, and has been so called from its fancied resemblance to a crab. "It is characterized by the existence of hard, semielastic, prominent excrescences of a cylindrical or rounded form, more or less discolored, and the seat of an unpleasant, itching sensation. Processes, roots, or branches usually extend from them into the neighboring parts, the whole looking very much like the cicatrix of a burn."

This is not a common affection; occurs at all ages, and, from my observation, is far more frequent in blacks than whites.

It sometimes comes on without provocation, and appears on various parts of the body; most generally it is the result of some local injury—of a wound, scratch, blow, etc., and in negroes it is often seen on the back as the result of the lash. The most common causes are burns and scalds.

These tumors vary greatly in size and shape. You see them from the size of a flattened pea up to that of a sausage, oblong, round, running into every conceivable irregular form—some resembling the irregular appearance of a crab, from which the name is taken: they are elevated above the skin from one-quarter of an inch to two inches, and the surface is wrinkled or puckered.

These tumors are usually hard, almost cartilaginous to the touch,

generally lighter than the healthy skin, and are devoid of sensibility. They are movable, being raised up easily with the surrounding skin.

The disease is attended by no danger, and has no tendency to degenerate into malignant form.

**Dissection.**—They are of fibro-plastic structure; the fibres intersect each other in every direction, inclosing spaces filled by soft plastic matter, which, when cut, to the naked eye presents a homogeneous appearance, whitish, and not unlike an unripe pear or turnip; it creaks under the knife like fibro-cartilage; its internal structure shows little vascularity.

**Treatment.**—There is no remedy for it. All sorts of remedies have been tried without avail, and the knife is worse than useless, as the disease invariably returns after extirpation.

### ELOID TUMOR.

This form of disease is extremely rare. Dr. Warren, of Boston, first described it, and gave it the above name, from its coil-like appearance. It is developed from the skin like the keloid, and is sometimes thrown up into coils like an inflated intestine. Like keloid, there is no known remedy.

### LEPOID.

This is a superficial formation, seen most frequently on the face, nose, or forehead of elderly male persons of delicate, florid complexion and light or red hair; sometimes single, but often occupying several points at the same time.

**Symptoms.**—It generally appears in the form of a small, circumscribed speck not larger than a mustard-seed, of a dirty grayish color, which becomes covered with a rough, brownish or greenish crust or scale resembling the bark of a tree, whence its name; if this be removed, or fall off, another soon forms; there is discharged a thin fluid which dries rapidly and forms the crust. The disease generally continues in this way for years with little increase, if left alone and not irritated.

Sometimes after long duration in this dormant state ulceration takes place, and the skin presents a red, glassy surface, spicular, pitted or granular, discharging thin, ill-formed pus. On examination, the skin is found to be of a gristly hardness, and much changed in texture. There is little pain, but troublesome itching.

Lepoid would seem to be closely allied in nature to lupus, or epithelioma, as when it degenerates and takes on an active form it pursues very much the same course, becoming decidedly malignant.

**Treatment.**—All treatment being unsatisfactory, the most prudent plan, as long as it is dormant and giving little trouble, is to let it alone. All irritating remedies, caustics, etc., should be avoided, and only a little mild ointment applied to render it soft and comfortable. If it is disposed to spread, we may then resort to destructive caustics or the knife.

### LUPUS.

Two forms of this disease have been described, viz., the **non-exedent**, stationary or serpiginous ulcer, and the **exedent** or corroding ulcer; the latter is called the cancrioid or voracious ulcer, and was formerly known by the name of **noli me tangere**, from its extreme sensibility. Lupus is the Latin word for wolf. The two forms in fact only differ in degree.

We can say nothing satisfactory about the **causes**.

Lupus may occur on any part of the body, but is far more common on nose, cheeks, and eyelids, especially the lower; rarely occurs before the age of forty; often breaks out on several points about the face at the same time.

These ulcers are exceedingly unmanageable, and when healed at one point break out at another. The discharges are of an ichorous nature, and the surface is covered by a brownish, characteristic scab. If a part heals, the new skin is hard, white, irregular, pitted, and prone to take on disease from slight provocation. The milder form, **non-exedent**, often described as the **serpiginous ulcer** of the face, generally begins either as a small, hard, white, shining tubercle, or as a fissure, crack or excoriation, with indurated edges and a thin, brownish incrustation; it soon spreads superficially, showing little tendency in the early stage to burrow beneath the skin, or even far into it. It is essentially a **superficial** ulcer, except when it attacks the nose, where its ravages are often terrific. When seated on the eyelids, it sometimes puts on this destructive form. The parts around the ulcer are hard, puckered, and tender, generally reddish, though not uniformly so. There is darting pain, and itching more disagreeable than the pain.

When the dark scab drops off, another soon forms; the surface is covered by florid, very sensitive granulations, and dirty pus; the edges are usually elevated and irregular; as the ulcer heals on one side it spreads on the other, leaving an ugly, burn-like scar.

**Treatment.**—None but soothing remedies should be used in this variety. The scab should not be removed, but when it drops off, an ointment of one drachm of iodide of potash to the ounce of cerate,



the white-lead ointment, or weak red precipitate ointment should be applied. Touching occasionally with a weak solution of iodine will often be found useful, as will a weak solution of nitrate of silver. A watery solution of opium or of morphine may be applied on lint when there is pain.

The general health should be attended to, and I have found decided benefit from ten to fifteen drops, three times a day, of a mixture of equal parts of Lugol's solution and Fowler's solution of arsenic.

I will here take occasion to call your attention to a formula of arsenic and iodine I am in the habit of using a great deal, which you will find useful, convenient, and easily made:—

R.—Iodine, one scruple;  
 Iodide of potash, two scruples;  
 Water, one ounce;  
 Fowler's solution, one ounce.

Dose, ten to fifteen drops, in water, three times a day, on an empty stomach, an hour before breakfast and dinner, and at bedtime.

**Lupus exedent**, or the more aggravated form of this affection, should clearly be classed with **epithelioma**, or the cancrioid form of disease, and is truly malignant or cancerous in its nature. It commences in a wart, tubercle, or crack; ulcerates, travels rapidly, and commits frightful ravages in a comparatively short time, extending not only superficially, but deeply into the subcutaneous tissues. The nose, lip, cheek, eye, etc., may be destroyed in a very short time. It sometimes, though rarely, becomes arrested in its course, and assumes a chronic form.

The ulcer has a worm-eaten or dug-out appearance, with ragged, everted, or overhanging edges; the surface is covered with unhealthy granulations, which discharge foul, ichorous matter; the surface around is tender, inflamed, hard, and œdematous. The pain is of a sharp, burning, lancinating, and very annoying character. The general health becomes much deranged; the strength and appetite much impaired; loss of sleep, and the patient gradually wears out and dies.

**Treatment.**—This is very unsatisfactory. The indication is, if possible, to destroy the diseased tissues. The knife has been fairly tried and with unsatisfactory result, and it is in this form of cancer that **escharotics** seem to answer best, and are the remedies by which quacks occasionally perform striking cures and make their reputation. Chloride of zinc, the Vienna paste, acid nitrate of mercury, the actual cautery, etc. have all been highly extolled. I should prefer the zinc applied with equal parts of flour, or other inert powder,

and allowed to stay several hours so as to produce a decided slough, and then follow it with poultices, mild ointments, and other simple dressings.

### MELANOSIS.

This disease rarely attacks the skin, and probably never except by extension from the deeper tissues; it is a malignant form of disease, and little under the control of the knife or other remedies.

### SCIRRHUS.

This is also a rare form of cutaneous disease. It most frequently commences in a whitish spot, a little elevated above the surface, but sometimes depressed; of very dense consistence, rough, firmly imbedded in the skin, at first movable, but soon becoming adherent to the tissues below. Blood-vessels are seen coursing over and around it; if cut into, it is seen to be composed of hard, fibrous bands, with a milky fluid in the interstices.

The progress is at first slow, but after a time an ulcer is formed which is irregular, jagged, foul, painful, burning, lancinating, and in every way characteristic of carcinoma; other spots frequently appear in the vicinity, or at a distance from the original seat. The disease marches steadily on till the patient is worn out and dies.

Sometimes the disease commences in the form of a spongy, strawberry-looking wart or excrescence, which bleeds readily. They occur successively on various parts of the body. I saw a very distressing case in the person of an English gentleman, Mr. Forbes, who had settled as a planter on the Alabama River. A small tumor of the kind described occurred on the middle of the inside of the arm, and, after remaining for two or three years, commenced giving a great deal of pain, and bleeding on the slightest touch. The integuments being soft and natural around its base I removed it, with a good portion of skin; it returned, with others on different parts of the body, and he died in about six months, after dreadful suffering. This case, as they sometimes do, put on more the character of fungoid tumor, or encephaloid, than true scirrhus.

The knife, or destructive caustics, in the early stage, afford the only chance of relief, and it is doubtful whether in genuine cases even these are ever successful.

## WARTS.

These are the little excrescences so commonly seen upon the hands and faces of young persons. They consist in a hypertrophied condition of the papillary and epithelial structure of the skin. We can assign no cause for them.

They are generally conical, with broad base, though sometimes attached by a narrow pedicle. The surface is rough, fissured, and tuberculated, and they bleed when cut. Those about the face sometimes degenerate into carcinoma.

**Treatment.**—They often disappear spontaneously, and are generally easily removed by strong caustic applications. The best local remedy is the **chromic acid** applied to the surface; they turn black, and drop off in six or eight days. Tincture of iodine, pure acetic acid, nitric acid, or the bichloride of mercury, also answer well.

## MUSCLES, TENDONS, SYNOVIAL BURSÆ, AND APONEUROSES.

These are so intimately connected in function and structure, that their injuries and diseases may be very naturally grouped together for consideration.

## MUSCLES.

**Muscles** are liable to wounds and lacerations, inflammation, atrophy, hypertrophy, different transformations, and especially fatty degeneration.

**Wounds** of muscles are remarkable for the retraction of the fibres, it being in proportion to the length of the muscle, the separation of the divided surfaces sometimes being as much as two or three inches. This is an important practical fact, as all available means, such as position, bandaging, etc., must be resorted to, to bring the parts as nearly as possible in apposition. The union is by ligament, and not muscle.

**Laceration** of muscles not unfrequently takes place from violent muscular efforts, in leaping, dancing, etc. The rupture is most apt to occur at the point of union of the muscular fibres with the tendon.

**Symptoms.**—There is usually a snap or sensation of rupture felt by the patient, with sudden inability to move the part; sharp pain, ecchymosis, vacuity at the point of rupture, and the patient often falls.

**Treatment.**—This must vary greatly in different cases. When the ruptured muscle is superficial and its function is important, it is sometimes best to cut down on it and bring the edges together with sutures. Proper relaxed position should be insisted on, and bandages and splints applied; one roller should be applied from below upward, and another from above down, meeting at the wound.

**Inflammation** may attack muscles like other tissues, but the treatment has nothing peculiar.

**Fatty transformation** is common, and usually the result of chronic inflammation, alone or aided by inactivity. The fibres become pale, yellowish, whitish, or a pinkish hue, greasy to the touch, and so soft as to be broken or torn readily by the fingers. Pressure forces out a clear, oily substance; this oily matter is not deposited simply between the fibres, but they are transformed into it.

**Ulceration.**—Muscles are little liable to the ulcerative process. Phagedenic or other corroding forms of ulceration do sometimes invade them.

**Contraction of muscles**, producing more or less deformity, is not an uncommon result of inflammation from cold, gout, rheumatism, wounds, etc.

**Treatment.**—The cause and nature of the inflammation, as gout, scrofula, etc., should be looked to and met with proper remedies. Frictions, etc. must be applied, and, when it can be borne, extension by proper apparatus resorted to, and, if necessary, division of the tendons.

**Atrophy** of muscles is not uncommon.

**Causes** are inflammation, palsy, defective circulation, inaction.

**Treatment.**—The cause must be first looked to and combated. Frictions; cold douche; exercise of the muscle; electricity, etc.

**Tumors.**—Hydatids, tumors of almost all kinds, simple and malignant, may be developed in and around muscles, and require no special mention here, as they are treated of elsewhere.

#### TENDONS.

**Tendons**, when divided subcutaneously and excluded from the air, unite by plastic matter very readily, and with little inflammation. When a tendon is divided, the muscle retracts, sometimes

an inch or two, and the whole space is filled with fibrin, which gradually becomes organized and unites the extremities firmly together.

When a tendon is divided by a cut or wound communicating freely with the atmosphere, union does not take place as in the above case, but the wound suppurates, granulates, and the space, like any other ulcer, is filled up with newly-formed tissue, and the extremities of the tendons become firmly adherent to the parts they are in contact with.

**Treatment.**—Where the wound is subcutaneous, a piece of adhesive plaster, to exclude air, rest and position, are all that is required. Where the wound is open, the ends of the tendon should be brought together with a silver suture, the wound closed, and treated by rest, position, water dressings, etc., like any other wound.

**Ruptures** resemble in symptoms, and require the same general treatment as **wounds** of tendons.

**Dislocations** and hypertrophy of tendons are also sometimes met with.

**Thecitis**, or inflammation of the sheaths of tendons, is a frequent and troublesome affection; it may be the result of cold, gouty or rheumatic inflammation, syphilis, sprain, blow, puncture or other injury. It may be acute or chronic. It is tedious in its course, giving much trouble, and is difficult to manage.

The most common sites are the sheaths of the tendons of the fingers, wrist, feet, elbow, ankles, and knee; and it may occur alone or in connection with inflammation of the bursæ or joints. About the fingers and hand particularly, it is not only inclined to travel along the sheath of tendons, but to attack the periosteum and joints, giving rise to intense inflammation and suffering, and is followed by great contraction and deformity.

**Treatment.**—This should be prompt and strictly antiphlogistic in the early stage; leeches may be applied; cold water or lead-water, or tincture of iodine. These are among the best local remedies; and the part should be elevated. Antimonials, purgatives, opiates, etc., should be employed, and any specific taint, as gout, rheumatism, etc., should be looked to.

**Ganglion.**—This is a small rounded cyst, situated on a tendon to which it is firmly bound. It is composed of a sac more or less firm, and filled with a white-of-egg-looking fluid. They vary in size from a pea to a pigeon's egg. In some cases of long standing, the contents are almost solid; small masses of organized lymph are sometimes found floating within.

There is no discoloration of skin, tenderness or inflammation; they are globular, ovoidal, movable, and elastic. They produce some stiffness and impediment in the motion of the tendon. These tumors are more usual in females, and are seen most frequently on the back of the hand and wrist.

These tumors are most common in hard-working people; and I have met them more often in washerwomen than others. It is a question how the cyst is formed, but I am inclined to think that it is simply a sacculated expansion of the sheath of the tendon; sometimes it communicates clearly with the sheath, while at others the connection is closed and the cyst distinct.

**Treatment.**—The ganglion is best managed by rupturing the sac, allowing the contents to be diffused in the tissues around, and then applying a small, hard compress with a bandage. The sac in recent cases may be sometimes ruptured by firm pressure with the thumbs; if this fails, the hand may be laid flat on a table and the tumor struck smartly with the back of a book. I have often succeeded well by dividing the sac freely subcutaneously with a very narrow knife, and then applying the compress. **Excision** or free incisions are improper, as the inflammation and adhesions caused may impair the functions of the part.

#### SYNOVIAL BURSEÆ.

These are sacs resembling very much ganglia. They are also called *bursæ mucosæ*, or mucous pouches, and exist in various parts of the body as semitransparent sacs filled with a thin, unctuous fluid, and most frequently about the joints of the extremities. They are for the most part interposed between bone and tendon, between tendons, bone, and skin, or tendon and skin, their use being to facilitate motion and to protect against pressure. They are most conspicuous in those situations subjected habitually to friction. They are sometimes developed in unnatural positions, as from the pressure of a shoe, crutch, artificial limb, etc.; they are very common on club feet. It is estimated that there are about one hundred and fifty of these sacs naturally existing in the normal condition of the body, many of which may be developed into disease.

“The largest and most important synovial pouches, surgically considered, are situated on the acromion process, the space between the hyoid bone and thyroid cartilage, the condyles of the humerus, the olecranon process, the styloid projections of the ulna and radius, the tuberosity of the ischium, the great trochanter, the anterior superior spine of the ilium, the front of the patella, the condyles of the femur,

the tuberosity of the tibia, the ankle, the calcaneum, and the heads of the first and fifth metatarsal bones at their palmar aspect."

Bursæ are subject to inflammation, suppuration, induration, and thickening, dropsical accumulations, and the development of fibro-cartilaginous concretions in their interior. The inflammation may be either acute or chronic, the latter being the most frequent. Pressure and friction are the causes most common; also occasionally blows, contusions, wounds, punctures, and gout, rheumatism, syphilis, are strong predisposing causes. The housemaid's knee, collier's elbow, and bunion on the great toe are good examples of this affection.

**Acute inflammation** is not common, but severe when it does occur; there is much swelling, great tenderness, tendency to unhealthy, erysipelatous inflammation, œdema, etc., and not unfrequently there is much constitutional disturbance. When opened, instead of the limpid fluid seen in health, the contents are turbid, sometimes bloody, with floating shreds of lymph. Sometimes suppuration and ulceration take place, giving much trouble.

**Treatment.**—This should be strictly antiphlogistic: leeches, cold, saturnine applications, emollient poultices, etc., with attention to the system; if suppuration takes place, a free opening should be made, a tent introduced, and poultices applied. In the mild forms, the tincture of iodine, or a blister answers a good purpose.

**Chronic Inflammation.**—This form of disease in the bursæ is often of very long duration, and produces very marked changes in the structure of the parts; the secretion becomes changed, the sac enormously thickened, with adventitious bands passing through it in every direction; the character of the sac becomes totally changed, the cavity very small, the surface rough and granular. The only remedy to be relied on is excision, which must be practiced with great caution in the neighborhood of joints.

There is sometimes a true **dropsical** collection in these bursæ, coming on slowly without apparent inflammation, tenderness, etc.; the housemaid's knee, which sometimes contains six or eight ounces of limpid fluid, is a good example of this form of affection. In other places the size may reach that of a foetal head, and the shape is irregular.

**Treatment.**—In the early stages they may be often relieved by the application of iodine, combined with bandaging. Blisters are, perhaps, the most reliable of all remedies; rest is also important. When the disease resists these remedies, we resort to the same treatment as in hydrocele, viz., puncturing with a trocar, and injecting the

sac with a drachm or two of iodine, diluted, or some other stimulating fluid. The seton also may be resorted to and kept in for a few days, till sufficient inflammation is produced. Occasionally we find in these bursæ, **loose concretions**, of fibrous or cartilaginous consistence, giving a good deal of trouble; they are irregular in shape, but generally resemble melon-seeds. They seem to be formed through the deposition of lymph from the surface of the sac, and detached by motion and friction. Sometimes bodies like small hydatids are also seen; they are both cured by incision, removal, and tent.

#### APONEUROSES

Are rarely the primary seats of disease, but play often a very important part, from being involved in the diseases of neighboring tissues. Gout, rheumatism, carbuncle, whitlow, inflammation from punctured and other wounds, sometimes implicate or are much influenced in their course by the aponeuroses.

**Chronic inflammation** in these structures is more common than the acute, and leads to various changes of structure, as thickening, induration, atrophy, ossification, etc.

**Treatment** to be conducted on the general principles of inflammation; when suppuration forms beneath, free incisions are important.

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#### LYMPHATICS—VESSELS AND GANGLIONS.

The diseases of this system are obscure, and we have much to learn as to the manner in which they become diseased, the part they play in the transportation of disease from one point to another; and the symptoms by which their diseases manifest themselves; erysipelas, elephantiasis, and other affections have been supposed to depend on the lymphatics, but it cannot as yet be demonstrated.

#### LYMPHATIC VESSELS.

**Angioloecitis** is the name which has been given to inflammation of these vessels, and sometimes that of **lymphatitis**. Its symptoms have been best studied in those cases arising from punctured or poisoned wounds, and other injuries. It is also seen as a consequence of skin diseases, and sometimes appears in the idiopathic form without any tangible cause.

When it arises from a wound, poisoned or not, about the hand, the



affected vessels may be traced beneath the skin in their course, as small, reddish cords, tense, nodulated, and painful to the touch, accompanying the principal veins and extending to the nearest ganglions, in which they seem to terminate. Sometimes only two or three of these cords are seen, while at others ten or a dozen are presented, forming a sort of net-work along their course. When there are many implicated there is swelling, with pitting and a good deal of tenderness and stiffness.

In those cases arising from the absorption of morbid poisons, the symptoms are much more marked; the swelling is great, extending over the entire limb, and the redness instead of being confined to lines, is diffused and puts on all the appearances of severe erysipelas. In some cases the deeper seated lymphatics become first affected, and a good deal of swelling, hardness, etc., may occur before the superficial vessels are implicated.

The lymphatic ganglions nearly always become enlarged and inflamed; occasionally the first symptoms are manifested in these glands.

The symptoms of angeioleucitis are declared from the beginning by constitutional disturbance, with depression, etc. In twelve or twenty-four hours after the injury, the patient feels chilly sensations, accompanied by flushes of heat, pain in different parts of the body and head, dry skin, etc. Sometimes the chill is severe, and followed at once by delirium and high fever, which soon assumes the typhoid form. The local symptoms become rapidly aggravated; the swelling is great, and foul abscesses are formed along the limb, the matter burrowing, like in phlegmonous erysipelas, extensively among the tissues.

**Diagnosis.**—This is not always easy; angeioleucitis may be confounded with erysipelas and phlebitis. The distinction can only be well made in the early stage when the inflamed lymphatics can be seen coursing along to terminate in the ganglions. In phlebitis, similar red lines are seen, but the cords are much larger, firmer, and more knotty, and deeply seated; they are also less numerous and involve less the glands. Erysipelas usually begins as a circumscribed superficial skin affection, without the striated appearance of the other affections.

**Treatment.**—This affection, as stated, resembles much erysipelas, and must be treated on the same general principles recommended in this and phlebitis. The exciting cause should first be removed, and the local symptoms met as they present themselves, bearing in mind that the disease is essentially typhoid in its tendency, and that antiphlogistics are badly borne. Leeches along the course of the in-

flamed vessels have been much lauded; but, to say the least, their efficacy is doubtful, as the bites are prone to produce erysipelatous inflammation in such conditions of the system. Iodine may be applied with benefit, and either warm or cold applications, as most agreeable to the patient. Hop or poppy fomentations give much relief, and strips of blistering ointment along the track of the inflamed vessels have been highly recommended. When matter-forms it should be early evacuated.

Quinine, tincture of iron, brandy, ammonia, must be used as symptoms indicate; anodynes also are indispensable.

A varicose enlargement of the lymphatics has been described by Carswell and others; but it is of very rare occurrence.

### LYMPHATIC GLANDS.

These are very common seats of disease, from various causes. They are very liable to inflammation, chronic enlargement from scrofula, and other causes; degeneration and tumors of various kinds.

Adenitis, or inflammation of these glands, may be acute or chronic, and is of very frequent occurrence. It is most usual in young subjects of strumous diathesis, and is excited by cold or local irritation affecting the lymphatic vessels. The inflammation may be common or specific, as that from syphilis, scrofula, dissection wounds, etc.

Acute adenitis is most generally seen in the glands of the neck, jaw, supra-clavicular region, groin, and axilla. One, several, or many glands may be affected at the same time, and the disease is rarely limited to one or two. It commences as a hard, tender knot, and increases in size with great rapidity, though varying from that of a pea to an egg. The increase is sometimes very quick, the size of a filbert being attained in a few hours; the cellular tissue around is implicated, the skin becomes inflamed, and the parts adjacent pit on pressure. The inflammation frequently puts on an erysipelatous appearance, and the constitution sympathizes.

Adenitis may end by resolution, suppurate, or become chronic. It sometimes vanishes in a few hours. Gentle friction with liniments, warm drinks, foot baths, etc., will sometimes, though rarely, remove it. In the severer cases, purgatives, diaphoretics, tartar emetic, etc. become necessary, with antiphlogistic regimen. Leeches, and the tincture of iodine, are often useful.

When suppuration takes place, which it does in from a week to

ten days, it does not confine itself to the glands, but involves the areolar tissue around. The abscess should be opened early, and followed by poultices.

**Chronic Adenitis** is of very frequent occurrence, either as the sequel of the acute form, or otherwise. It is sometimes very slow in its course, changing entirely the structure of the glands; when cut into, it presents the marks of the inflammatory process. The color is various, according to the degree of vascularity and character of the deposits: sometimes they are enlarged and much indurated, and at others softened. Sometimes it cuts, and looks like a green pear or turnip. The hardness is occasionally so great as to resemble scirrhus, and frequently the gland is enveloped in a capsule formed of condensed cellular tissue. A single gland may attain considerable size, but usually a number are agglomerated together, forming a nodulated mass, sometimes attaining the size of an orange.

These hypertrophied glands may occur in any part of the body, but are generally seen in some part of the neck. They are also seen in the cavities, as the chest, about the root of the lungs, the mesentery, pelvis, etc.; interferes with respiration, assimilation, parturition, etc., by pressure from their position and size.

A variety of causes give rise to enlargement of these glands, some of which are constitutional, others local. About the neck they may arise from cold, or disease of jaw, gum, tonsil, or other local irritation; in the groin, from ulceration of the penis; in the axilla, from affections of the mamma, or injuries about the hand or arm; in the mesentery, from irritation of the small intestines, etc. A strumous state of the system, however, is the most prolific cause.

This chronic enlargement is always more or less obstinate, and often continuous for years.

**Treatment.**—This is both local and constitutional. The exciting cause, when discovered, should first be removed; a carious tooth; ulcer on the penis must be removed before the effect can be got rid of. The general health is much concerned, and must be attended to. Sometimes the antiphlogistic treatment may be at first required, but rarely. Commonly the opposite course is demanded, as good, nourishing diet, quinine, iron, cod-liver oil, pure air and exercise, together with the specific, alterative effect of iodine; smart purging, when the tongue is foul, often facilitates the cure much.

The local remedies are discutient liniments, and particularly the tincture or ointment of iodine, the mercurial plaster, etc. Blisters and steady compression are often of great service; the pressure may

in many cases be well made by a truss. When other remedies fail, and the symptoms demand relief, the glands may sometimes be extirpated by the knife; but great care should be taken to avoid the important anatomical structures around them.

**Scirrhus** and **encephaloid** sometimes attack these glands, and soon put on the characteristic appearances they present in other parts.

**Tubercular** disease of these glands is most commonly met in young subjects, and often coexists with tubercular disease in the lungs, joints, and other organs. They sometimes undergo earthy degeneration, looking like bone, and at others are the seat of fibro-plastic growths, for either of which excision is the remedy.

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### DISEASES AND INJURIES OF NERVES.

When divided, nerves are readily united, if in close apposition, by plastic matter, which, though not assuming the identical structure of the nerve, answers to transmit the nervous current. If, however, the retraction be great, or a portion of nerve be removed, the interval is supplied by ligamentous matter which does not transmit the current.

When a nerve is severed, its **function** is completely arrested for the time being, whatever it be. When a nerve of large size is divided, considerable time is required for the restoration of its function, and it sometimes never regains again its normal action, there being some numbness, or confusion of sensation or motion. This probably arises from a want of nice apposition in the fibres of the nerve.

The **treatment** is much the same as that of other wounds, bearing in mind the necessity of bringing the divided ends as nearly in apposition as possible; where they are widely separated, they may be brought together by a very delicate suture passed through the neurilemma.

When nerves are **punctured** or partially divided, they are apt to cause severe pain, spasm, perverted sensation, neuralgia, numbness, and derangement of the general health. The proper remedy is division of the nerve. This operation is not always successful, and occasionally the nerve at the part becomes thickened, and requires **excision**.

Sometimes, in consequence of **contusion**, nerves are bruised, become inflamed, and their functions impaired.

## TETANUS, OR LOCKED-JAW.

This is a peculiar condition of the nervous system, characterized by violent contraction of the voluntary muscles, with irregular intervals of partial relaxation. When the contraction is confined to the muscles of the lower jaw, closing the mouth firmly, it is termed **trismus**; when the body is bent firmly forward by the action of the abdominal muscles, the affection is denominated **emprostotonos**; and **opisthotonos**, when bent backward by the dorsal muscles.

It has been very properly divided into **traumatic** and **idiopathic**, **acute** and **chronic**. It is frequent in children within the first ten days after birth, and is here termed **trismus nascentium**. The traumatic and infantile forms are common, and the idiopathic rare in our country.

The causes of traumatic tetanus are various forms of external injury, as punctured or lacerated wounds, fractures, dislocations, extraction of teeth, gunshot wounds, surgical operations, etc. The causes are sometimes of the most trivial kind. Injuries on any part may produce tetanus, but those of the feet and hands are most likely to do so, and the most usual of all are small punctures in the sole of the foot from treading on nails.

**Symptoms.**—The period of development varies from a few hours to several weeks, but generally from four to fourteen days elapse; often occurs after the wound has healed.

The attack is preceded by **malaise**, restlessness, stiffness about the jaws and neck; difficulty in protruding the tongue; uneasiness at the epigastrium, and rigidity of the abdominal muscles. These symptoms, at first very faint, become aggravated; the rigidity of the muscles increases; the jaw is firmly locked; there is inability to turn the head; attempts at deglutition excite spasm in the throat and a sense of suffocation. The disagreeable sensation in the precordial region becomes greatly aggravated, the distress extending back from the ensiform cartilage to the spine, and with a feeling of painful constriction. The muscles of the back and abdomen, and next, those of the extremities, become rigidly contracted; the contraction is so great as to bend the body like a bow, backward or forward, according to the muscles brought in play. The rigidity exists more or less all the time, but distinct spasms, sometimes amounting to convulsion, come on at irregular intervals of some minutes. The muscles of the face are drawn, the eyes sunken, and the whole expression is haggard and greatly changed; the respiration is laborious, and any attempt to

swallow brings on a paroxysm, as does a slight current of air. The sufferings of the patient become very great.

There is usually little tendency to fever, and the pulse rarely goes above eighty or ninety in a minute. All the functions are more or less disturbed; bowels constipated; urine scanty and high colored; skin bathed in a copious, clammy perspiration; mind usually perfectly clear throughout.

The above is the common course, but there are occasionally irregularities seen in the muscular contractions, and other symptoms. I have recently seen a case in which the muscles of the jaw were not implicated, the patient being able to open his mouth easily at any period of the attack. Sometimes, on the contrary, the muscles about the mouth and neck are the only ones affected.

Tetanus bears no resemblance to any other form of disease but hydrophobia, and the diagnosis between them is easy.

The prognosis in traumatic tetanus is extremely unfavorable, death occurring generally in from three to six or seven days. Professor Gross says, "in an experience of thirty-one years, I have seen but two cases where the patient escaped with life, and then after a protracted and painful struggle." This assertion surprises me, as I am sure I have seen at least a dozen survive it. I had three cases at one time under treatment, and all recovered: one from a splinter under the finger-nail; one from the bursting of a varicose vein; and the third was idiopathic. I say this too without having confidence in any particular course of treatment.

The cases which I have seen recover, have been those of chronic form, lasting from thirty to fifty days, and the spasms never being very violent.

**Pathology.**—Of this we know nothing.

**Treatment.**—Unsettled and unsatisfactory.

## NEURALGIA.

This is characterized by an intense pain occurring in some nerve; usually intermitting and irregular in its attacks, and liable to occur in any part of the body; generally dependent on some local irritation, but sometimes, perhaps, on derangement of the digestive apparatus, etc. Our object here is to treat the disease in a surgical point of view, and not to follow it in all its intricacies, which belong more particularly to another chair.

**Causes.**—These are many, and of opposite character. The nervous temperament is most liable. Cold and damp—in fact, all the causes

of rheumatism seem to be productive of neuralgia, and it is sometimes hereditary. Injuries, mechanical irritation or pressure in any form, as by tumors, etc., are frequent causes.

The most terrible attacks are seen in the trifacial nerve, from diseases of the teeth or jaw; foreign bodies, as balls, splinters—in short, pressure, exposure, or irritation of a nerve in any way, may produce the disease. It is occasionally caused by derangement of the digestive organs; by worms, etc.; and is a common attendant on uterine diseases. Amputations, and other operations where nerves are divided, not unfrequently cause it. Malaria is also a well-known cause, the disease assuming a distinct intermittent type.

**Symptoms.**—The pain assumes every possible grade and form, and is often intense beyond description or endurance. Sometimes it is confined to a single spot, at others is diffused, or changes locality rapidly and frequently; at one time affecting one branch, and at another many. It is important to remark that the seat of the pain is no guide as to the true seat of the disease, or its cause. Derangement of the digestive organs may produce neuralgia in many parts of the system; a carious tooth may produce pain in the face, hip, etc. Spinal irritation may produce neuralgia in the leg, foot, toes, etc. (Case of John B.)

**Pathology** of neuralgia is very imperfectly understood. In some cases the nerve or neurilemma is found inflamed or thickened, while at others no change can be detected. The causes we have already spoken of.

**Treatment.**—This will depend in a great degree upon the cause, which must always be removed if possible: a carious tooth, a tumor pressing on a nerve, a cicatrix, etc. may be exciting causes, and the disease relieved by removing them; worms, derangement of stomach, malarious influence, are other causes to be kept in mind. Even when the exciting cause is removed, the neuralgia still remains, and in an intractable form in many cases.

In fact, there is no one remedy or class of remedies suitable to all cases. In those cases arising from malarious influences, quinine, iron, and arsenic are the remedies; in those cases connected with general debility and derangement of the nervous system, these and other tonics must be relied on. Where the digestive organs are at fault, purgatives, alteratives, and tonics are the remedies. Emetics are sometimes very useful.

The diet also should be strictly attended to.

After quinine, probably arsenic enjoys the highest reputation of any article in this affection. Strychnine, aconite, Indian hemp, have

also been much recommended, and the preparations of opium are indispensable for the relief of pain.

Among the **topical remedies**, may be enumerated particularly counter-irritants, blisters, leeches, morphia, aconite, stramonium, and other narcotics, and hot applications.

Of the counter-irritants, blisters are best; in mild cases, iodine or ammonia is useful; morphia may be applied on the denuded blister, over the seat of pain, with great benefit. The veratria ointment in chronic cases sometimes affords great relief.

The **subcutaneous** injection of morphine, and other narcotics, has lately come into use, and in many cases relieves the sufferer.

**Section or excision** of a portion of the nerve has been performed with very variable success. Although they often afford temporary relief, the pain almost always returns soon or late.

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### DISEASES AND WOUNDS OF ARTERIES.

This is one of the most important classes of affections that can attract the attention of the surgeon. Hemorrhage, particularly from a wounded artery, is one of those troubles which the surgeon has constantly before him; this is a leading danger which he fears in every important operation, and every wound.

When called to treat a hemorrhage, the first point is to determine whether it is **arterial** or **venous**. If it be arterial, the blood is of a scarlet color, and it is discharged in intermittent jets, corresponding with the pulsations of the heart; when it comes from a vein, the blood is dark, and flows in a continuous stream. In very small arteries the stream is often continuous, and darker, but is thrown out with more force than when from a vein. When any artery of any size is entirely divided, as in an amputation, the blood will sometimes be thrown half across a room. When the vessel is large, the hemorrhage may be fatal in a few seconds or minutes.

The most common course of profuse hemorrhage, is for the patient to become exhausted and faint from the loss of blood, and the action of the heart almost entirely arrested, during which condition the blood coagulates in and around the extremity of the divided vessel or vessels. After a time the patient reacts; the action of the heart becomes stronger; the column of blood is driven against these slight barriers; and, when the vessels are large, the clots are driven out of the way, the hemorrhage recurs, and the patient, after one or two more of these recurrences, becomes exhausted, and sinks.



## WOUNDS OF ARTERIES.

**Wounds of arteries** may be incised, punctured, lacerated, contused, or gunshot. These wounds may be large or small, transverse, oblique, or longitudinal, or the artery may be partially or entirely divided.

When an artery is completely divided, there is rapid and copious flow of blood, followed by retraction and contraction of each end; the effect of this double action is to diminish the flow, but not to arrest it, except in very small vessels. The flow continues usually until a coagulum has formed in and around the orifice, in the cellular tissue, and particularly in the loose sheath. The flow in this way is impeded, but the final arrest is greatly aided by a coagulum forming **within** the vessel and extending as high up as the first collateral branch.

The clots, of which the first bears the name of **external**, and the other that of **internal**, are the means which nature employs to arrest the hemorrhage, but not generally until after fainting, which is favorable to the coagulation of the blood, and gives time for the formation of these external and internal clots. The coagula are at first very soft, and easily removed, and it is not until plastic matter is effused in and around the vessel, and adhesions form, that their protective power against hemorrhage can be relied on. This soon takes place, as inflammation is established in a few hours, and the clots, vessel, and tissues become more or less firmly united, according to the length of time which elapses without disturbance from hemorrhage or other cause. The absorbents set to work; the coloring matter and serous portion of the effused blood are removed; blood-vessels shoot out, passing through the plastic deposit, which becomes organized, and unites the parts all firmly together.

The external and internal clots are now firmly blended at the orifice of the divided vessel, like the cork of a bottle well sealed over. The outer coagulum is rough and irregular; the internal one smooth, and conical at its cardiac extremity. The longer the internal coagulum, the less danger of hemorrhage. The changes are going on for two or three months before they are entirely completed; the clots being all wholly absorbed, and the vessel being finally reduced to a fibrinous cord as high up as first branch above.

The foregoing is the process by which nature arrests hemorrhage from a divided artery. First, in the exhausted or fainting condition from loss of blood, the two clots are formed, the vessel having retracted

within its sheath, and contracted in caliber; next, by the deposition of lymph, and the agglutination and organization of the parts, the clots are firmly fixed *in situ*, and the hemorrhage permanently arrested. Nature next sets to work to remove what is not required, and to consolidate the tissues. The process is very interesting, and analogous to that by which fractured bones are united.

When an artery is only partially divided, whether transversely, obliquely, or longitudinally, the efforts of nature are much less efficient in arresting hemorrhage. The vessel cannot retract within its sheath; it does not contract in caliber; and while an imperfect external clot is forming, it is much more difficult for an internal one to form; when reaction takes place after the fainting fits, there being little impediment to the current of blood, the external clot is washed out of the way and the hemorrhage returns at intervals, till the patient is exhausted. So with plastic matter when deposited, it is washed off and adhesions prevented.

Spontaneous cures do sometimes take place when the wound is small, the longitudinal being less dangerous than the oblique, and the oblique less so than the transverse wounds in arteries, for obvious reasons. Such wounds, when not fatal, are very prone to result in aneurism, as is sometimes seen at the bend of the arm, from venesection.

We have already given the reason why contused and lacerated wounds bleed less than the incised.

Nature, as we have seen, makes powerful and well-directed efforts toward the arrest of hemorrhage from wounds; but the prudent surgeon should never trust them where his means are available.

**Treatment.**—The principal means for arresting hemorrhage are the ligature, compression, styptics, and torsion.

**Ligatures.**—Different kinds are flax or silk, well waxed; animal ligatures, made of buckskin and other substances; also, metallic ligatures.

Manner of using the forceps and tenaculum.

Importance of excluding nerves and veins, and of isolating the artery as much as possible.

Manner of applying and tying ligatures; importance of dividing the internal and middle coats, but at the same time no violence is necessary in tightening the ligature; one end of ligature to be cut off.

When the coats of the artery are diseased, the small hard ligature will often cut through, and we should then resort to a small flat one, of narrow braid, or several loose threads, well waxed and spread out.

**Process** by which the ligature permanently closes an artery. When the coats of the artery are so softened from inflammation as we sometimes see them in secondary hemorrhage, it becomes necessary to cut down upon the artery above the wound, and ligate it where it is sound. Where we tie an artery in its continuity, as in cases of aneurism, etc., we use what is called an **aneurismal needle** to pass the ligature, and care should be taken to separate the artery as little as possible from its sheath.

When an artery is divided in a limb or elsewhere by a wound, it is a fundamental principle in surgery that *both ends should be tied*. If the cardiac extremity alone be ligated, anastomosing branches will almost surely cause bleeding in the distal extremity.

The hemorrhage from the distal end is not so active as from the other; not spirting out so much in jets, it is darker and flows more like venous hemorrhage, but is none the less dangerous. This end of the artery retracts and contracts less than the other, and is less capable of forming an efficient clot.

**Period** at which the ligature is detached varies according to circumstances, viz., the size of the ligature and manner in which it is tied; the state of the artery and the amount of inflammation. A small, hard ligature cuts its way through sooner than a large one; a sound artery resists longer than a diseased one, and much depends upon the artery alone, without other tissues being included in the ligature. The time at which the ligature is detached varies from one to three weeks, according to the size of the artery, other things being equal. There are instances where the ligature has held on for forty or fifty days, or more. There are examples where the ligature has not come away for many months—in one case thirteen months; but I think it bad surgery to allow it to remain so long.

After a reasonable time has passed, gentle traction should be made on the ligature when the wound is dressed; and I have succeeded in detaching it, by attaching an elastic string to it and fixing the end with adhesive plaster, so as to make permanent traction.

**Compression** is also an important means of arresting hemorrhage; it is applicable in some cases where the ligature cannot be used, and is particularly applicable in those cases which the injured artery is situated over a bone, as the arteries beneath the scalp, the radial and ulnar, etc.; also where the hemorrhage is from a number of small arteries, instead of one large one.

The compression may be **temporary**, to gain time till other means can be used; this may be done with the finger, tourniquet, bandage,

and compress, etc. In **permanent** compression, it is continued until the vessel is completely obliterated, whatever time may be required.

Temporary compression is particularly applicable in incised or gunshot wounds of the extremities, where the surgeon is obliged to act promptly to save life; it may be applied by the finger, the tourniquet, or compress and bandage over the main trunk of the artery, as the femoral, brachial, etc. It should be borne in mind that this can only be a temporary resort, as the arrest of the circulation in a few hours causes pain and numbness, and if continued too long, results in mortification.

The **Spanish windlass**, made of a handkerchief and stick, is a good temporary resort; this is also called the field tourniquet. The finger applied to the brachial or femoral artery is less uncomfortable, and often answers well.

**Permanent** compression is sometimes applied **directly** to the bleeding surface, as in the operation of lithotomy, wounds of the rectum, bleeding of the nose and uterus, in operations on the maxillary sinus, and other deep wounds where the ligature cannot be applied.

There are many objections to this mode of suppressing hemorrhage, the principal of which are the pain, inflammation, and suppuration caused; it should therefore never be employed to arrest hemorrhage from a large artery, but is particularly applicable to those cases where the bleeding is from a number of small arteries, particularly in an exposed cavity or a deep-seated wound.

The compression in some cases is best performed by a **graduated** compress, made of sponge, cotton, lint, etc. The bleeding surface must be well cleansed of blood, etc. before the compress is applied, and it should be placed directly in contact with the bleeding vessels.

After the part is dressed, absolute rest and elevated position are all-important. The dressings should not be disturbed for four or five days if they are well borne.

**Indirect** pressure is made by placing the compress on the track of the artery above the wound, and is often the surest plan. The best way is to apply a narrow compress, two or three inches long, on the track of the artery, fixing it firmly with a roller, commencing at the distal extremity of the limb, so as to form an equal support throughout. This answers well in wounds of the brachial artery at the bend of the arm.

**Styptics** are those local remedies which arrest hemorrhage by their direct action on the blood and its bleeding vessels. There are an infinite variety, including astringents, caustics, etc.

Of the astringents, alum, perchloride of iron, tannin, and sulphate

of copper, are the most potent and most employed. The bleeding surface should be well cleansed of blood, and the styptic applied directly to the bleeding vessels. The alum may be applied in a strong solution, or in powder on lint, and is one of the best; the perchloride of iron is now most used, and though rather irritating, is very useful. The persulphate of iron is also very powerful and useful. Tannin is less powerful than these mineral preparations, but often answers good purpose.

Cold is also a useful means of arresting bleeding, in the form of cold air, douche, ice, etc.

The **actual cautery** is peculiarly applicable to certain cases.

**Torsion**, what and how used.

**Secondary hemorrhage** is not necessarily preceded by **primary** hemorrhage, but may come on from a diseased or wounded part, where little or no hemorrhage had occurred before. The period of its occurrence is very variable—sometimes in a few hours, days, or even weeks. The bleeding often comes on without any assignable cause, suddenly and unexpectedly, and the loss of blood may be great before proper assistance is commanded. When it comes from a large vessel, death may be the consequence in a few minutes; the scarlet hue of the blood denotes its arterial source.

The principal **causes** which induce secondary hemorrhage are—1st. Faulty application of a ligature. 2d. Diseased state of the arteries. 3d. Improper traction on the ligature. 4th. Tight dressing or dependency of the part. 5th. A hemorrhagic diathesis. 6th. Spasm, or too much motion in a stump. 7th. Sloughing.

**Subcutaneous hemorrhage** is where the blood comes from an artery wounded by a puncture, spicula of bone, or other cause; pours the blood out beneath the skin, and it is extravasated through the cellular tissue and among the muscles, etc. It is sometimes poured out in very large quantity, distending greatly the parts, producing pain, numbness, œdema, and discoloration.

There is more or less pulsation usually present, particularly in the early stage; and on applying the ear near the wound, there is a peculiar thrilling or purring vibratory sound, such as is generally heard in aneurisms; and hence it has been denominated **diffuse aneurism**. The term, however, is not strictly proper, as there is no dilatation of the artery itself. The blood coagulates; pressure is produced on the surrounding tissues; inflammation, suppuration, and not unfrequently sloughing follow; and the patients may die from constitutional disturbance, or from bleeding.

The **treatment** is the same as that for an open wound; the artery must be tied at both ends, and the coagula cleared out. The operation is often exceedingly difficult; but this, or amputation in many cases, are the only resources.

**Collateral Circulation.**—The *manner* in which the circulation is re-established in a limb, after the obliteration of the main artery.

**Hemorrhagic Diathesis.**—By this term we mean a peculiar state of the system, in which, from a trifling wound, there is a strong tendency to the inordinate discharge of blood, and often difficulty in arresting and preventing its recurrence. The lives of persons are thus often put in danger from the most trivial causes. The hemorrhage sometimes occurs from the rupture of small vessels in the mucous membrane of the nose, rectum, lungs, bladder and other parts; even the extraction of a tooth may produce it in an alarming degree.

In this variety of hemorrhage, the blood oozes out at every pore, and does not come in a stream as if from a vessel. This diathesis is sometimes seen in a whole family, or is hereditary. Of the *causes* we know nothing; the *prognosis* is uncertain.

The **treatment** is mainly such as is calculated to improve the condition of the blood, and give tone to the system generally. When a hemorrhage takes place, we should resort to astringents internally, such as the acetate of lead, tannin, etc. The condition of the system must be attended to, and indications met. If there is fever or derangement of the digestive organs, these should be removed, and then tonics, such as iron, quinine, vegetable bitters, etc., with fresh air and exercise, etc.

Styptics, pressure, and caustics, must be resorted to for the immediate arrest of the bleeding, where they can be applied to the bleeding surface.

## DISEASES OF ARTERIES.

Arteries, like other parts, are liable to inflammation, both acute and chronic, suppuration, softening, ulceration, and various transformations.

### ACUTE ARTERITIS.

**Acute arteritis** is generally the result of a wound or the extension of inflammation from a neighboring tissue; it may, however, come on as an idiopathic affection, particularly in gouty or rheumatic subjects. It is usually restricted to one artery, but occasionally becomes wide-spread.

**Symptoms** and **progress** of the traumatic and idiopathic forms.

**Suppuration.**—This sometimes occurs, but is much less frequent in arteries than veins. **Gangrene** is very rare.

**Softening** of arteries is a common affection, especially in the smaller branches; it is often an attendant on organic diseases, cancers, etc.

**Treatment.**—This must be conducted on general antiphlogistic principles; but the disease is difficult to control.

#### CHRONIC AFFECTIONS.

The most usual of these are the fibrous, earthy, and atheromatous transformations; they are of frequent occurrence, and particularly interesting from their connection with spontaneous aneurism. These transformations are almost peculiar to elderly subjects; they all render the coats of the artery brittle, and generally occur together; they commence in the cellular tissue, between the coats of the vessels, which, however, are soon involved in the degeneration.

“The **fibrous transformation** is characterized by the appearance of small, hard, firm patches beneath the serous coat of the arteries, usually isolated, but sometimes grouped together; of no definite shape, thin, and of a whitish, grayish, or pale yellowish aspect.” When they are numerous, the artery is converted into a firm, inelastic tube. The deposit is originally fibrin.

The **earthy degeneration** is most usual in old subjects after the sixtieth year, though sometimes seen earlier; it is most common in the aorta and its primitive branches, though occasionally occurring in the smallest branches; much more common in males than females. I have seen every artery in the body that could be felt externally by the touch, in a female of twenty-three, transformed into hard, incompressible cylinders. The earthy matter deposited is phosphate and carbonate of lime, without the structure of bone, although it is sometimes termed ossification; it may be deposited in patches or rings. The effect is to render the artery brittle.

The starting-point of this deposit is the subserous cellular tissue, whence it extends to the substance of the inner and middle tunics, both of which are sometimes completely transformed; the outer coat is rarely implicated. The **cause** is chronic inflammation.

The **atheromatous deposit**, usually denominated the **fatty degeneration**, is more frequent in Europe than this country; and this seems to be the reason why aneurism is so much more common there, particularly in Great Britain, than with us.

This deposit, like the earthy, commences in the subserous cellular tissue, in minute, isolated points, not larger than the head of a pin;

of a pale-yellowish, whitish, or brownish color, somewhat greasy to the touch, and of a semiconcrete, friable consistence. After a time these points coalesce and form irregular-shaped patches, which, pushing the lining membrane before them, may involve the whole circumference, or extend several inches longitudinally.

After a time the deposit softens, and is converted into a curdy, friable, or pap-like substance, resembling closely scrofulous pus. The lining membrane of the artery becomes elevated often into small pustules, or little abscesses, which, bursting, discharge their contents into the blood and leave little ulcers, whose base is formed by the middle coat.

The fatty deposit is most frequent in the thoracic aorta and about the origin of the large vessels of the arch; it is most common in the aged, the intemperate, and the gouty. Under the microscope the atheromatous matter consists of albuminous and earthy particles, of crystalline plates of cholesterine of an imperfect fibrous texture, and oil globules. The oily matter is often so great as to impart a greasy feeling to it.

There is no **treatment** for these transformations.

**Ulceration**, as a consequence of arteritis, is seldom seen; occasionally, however, it occurs, and may partially or entirely perforate the tunics; they vary from one to several lines in extent, and are usually caused by some of the transformations just described.

#### VARICOSE ENLARGEMENT.

The arteries may be dilated and nodulated, like veins, and are hence termed **varicose**. The affection has been described under the name of varicose aneurism and of aneurismal varix. The arteries become elongated, much dilated, and tortuous; it is a very rare lesion, and is most frequent in superficial arteries, particularly in those of the head, forearm, leg, and foot, and seems to be the result of inflammatory action. It may affect a small portion, or the entire artery; or it may affect one or many at the same time. When superficial, the diagnosis is easy; when deep seated, it is impossible.

**Treatment.**—It rarely requires any; if it gives inconvenience, it may be supported by bandage or other means. If it really gives serious inconvenience, the vessels should be ligated on the cardiac side of the enlargement.

#### ANEURISM.

An aneurism is a pulsating tumor, occupied by blood and communicating with an artery whose tunics are partially or entirely de-



stroyed. There is an occasional exception to this definition, where all the coats are entire, but such cases are extremely rare. The subject has been much complicated by too much refinement in terms. There are, however, certain terms which are useful and should be retained; such are **true** and **false** aneurism; so with **spontaneous** and **traumatic**. The term varicose aneurism is also one not strictly correct, though it is in general use; it is not an aneurism, but a **dilated** artery. **Anastomotic** aneurism is also another incorrect term, though generally adopted; it is a hypertrophied state of the arterial and nervous capillaries of a part. It matters little whether these terms bear criticism or not, if we understand clearly what is meant by them.

**True Aneurism.**—This term is applied to that variety in which one or more of the arterial tunics, without being necessarily perfect, form a part of the tumor.

A **False Aneurism** is, on the contrary, one in which all the coats have given way, and the sac is composed of the surrounding cellular tissue in a condensed state.

Each of these divisions comprises several varieties, founded principally upon the form and volume of the tumor: thus the **sacculated**, the **cylindroid**, etc. The terms **circumscribed** and **diffused**, refer merely to the dimensions of the aneurism.

Any one or two of the coats may give way, and the sac be formed by the remaining one or two, in **spontaneous** aneurism.

**Locality.**—Spontaneous aneurisms are more frequent in some parts than others. The aorta is the most common seat—at its origin, arch, or descending portion. Next come in frequency, the popliteal, the femoral, carotid, subclavian, innominate, axillary, and iliac.

The causes for the appearance of aneurism in one artery in preference to another are obscure; but there are, however, circumstances worthy of notice in this connection.

Those arteries which are most prone to the **degenerations**, atheromatous, earthy, etc., of which we have spoken, are those most liable to aneurism. The degree of force with which the blood impinges on certain portions of a vessel may have much to do with their development. The degree of motion, too, to which an artery is subjected in sudden and violent efforts, as the aorta and popliteal, etc., is another cause.

We have already alluded to the infrequency of aneurisms in the United States, compared to Europe. They seem to be more common in New York than elsewhere, in our country.

We have before said that true aneurism presents itself under the **tubular** and the **sacciform** varieties; each may be composed of one or two tunics, and enlarge to an indefinite extent, and terminate in death. The **sacciform** is the most common, and is in the form of a pouch, sac, or bag, connected with the side of the affected artery. In the **tubular** variety, the entire circumference is involved. The **sacciform** variety presents many different forms: the most common is the globular or ovoidal; sometimes conical, elongated, or flattened. They also vary much in dimensions. The attachment of the tumor to the artery is generally by a narrow footstalk; at other times the base is broad. The size and shape of the opening varies greatly, as well as its position.

The sac is usually composed simply of the external tunic, the inner and middle having given way; and when this support is withdrawn, the dilatation commences, and continues until the pouch is formed. The sac would soon become greatly attenuated, and give way, did not inflammation in and around the sac take place, depositing lymph, by which its walls are thickened and glued to the surrounding tissues. It has already been stated that, in very rare cases, the sac may be formed of one or both of the internal coats.

The sac varies in thickness, from a line to the fourth of an inch. It is sometimes very tough, consisting of several fibrous layers. The sac is rough on the outside, and smooth on the inside, but this also becomes rough after a time, from fibrinous deposits within. The dilatation goes on for months, often for years, till the sac finally becomes thinned, and gives way at some point, and death from internal bleeding ensues.

The sacciform aneurism always contains, even in the early period of its formation, **fibrinous concretions**, which seem to be designed to strengthen the walls of the tumor, and occasionally to bring about a spontaneous obliteration. These clots are concentric, like the layers of an onion. They differ much in color and consistence: the recent ones resembling coagula of blood, with the coloring matter more or less removed; and those of long standing, of a pale, dense, fibrinous appearance. Their thickness varies from the thickness of one to that of several sheets of paper, and their number may extend to many hundred. They are organized, as is proven by their firm adhesion to each other and to the sac. There has been much discussion about the formation of these concretions. The fibrin of the blood seems

to be deposited in successive layers, and to become organized—this is all we know about it.

The **Tubular Aneurism** is extremely rare; it is confined almost entirely to the aorta and its large branches, and consists in a uniform dilatation of the vessel, and is usually composed of all the tunics, more or less altered; it is generally fusiform. It has also been denominated **cylindroid**. The coats become much and uniformly thickened, sustaining the pressure equally in every direction; and it is a striking peculiarity of this form of aneurism, that it rarely gives way by rupture. It is also remarkable for the absence of fibrinous concretions.

**Symptoms of Aneurism.**—Of these there will be found a want of correspondence in different cases.

In spontaneous aneurism, the first symptom is a sharp, sudden pain, marking the rupture of one or more of the tunics of the artery, and a pulsating tumor may be immediately discovered; but this is very rare. In the great majority of cases the progress is slow, and the disease has made considerable advance before it attracts the patient's notice. In traumatic aneurism, on the contrary, the symptoms are usually developed immediately after the receipt of the injury. The aneurismal tumor is at first small, not larger, perhaps, than a filbert, but may be gradually developed to the size of an adult head. It pulsates forcibly with the action of the heart to the touch, and the pulsation may, in well-developed cases, be seen across a room. It is soft, and in the early stages may be emptied by pressure. Upon applying the ear to the tumor a peculiar sound is heard: in general, it is a sawing, rasping, or bellows sound; in other cases, it is a whizzing, whirring, or purring sound. It is much modified by pressure on the artery above or below. It is very important to remark that, in large aneurisms, no pulsation or sound can be distinguished in many cases, in consequence of the thick fibrinous concretions within.

There is more or less pain in aneurisms, depending mainly upon their seat, the parts pressed upon, and the degree of inflammation caused; there is also numbness from the pressure in the distal parts, and œdematous swelling, from pressure on the lymphatics and veins. From the obstruction to the circulation in the sac, the vessel beyond contracts and the collateral branches dilate.

Aneurism of the thoracic aorta, the innominate, and carotids, is nearly always attended with distressing dyspnoea, severe pain, and palpitation of the heart, which is itself often seriously implicated in

the disease, being liable to suffer from hypertrophy, softening, and fatty degeneration, together with chronic endocarditis and disease of the valves. Death in these cases may be produced either by pressure, causing inflammation or asphyxia, or by the giving way of the sac, and hemorrhage.

**Diagnosis.**—This is generally easy, but there are sources of error, and you cannot be too careful in making your decision. I have myself seen a distinguished surgeon plunge a bistoury into a popliteal aneurism, mistaking it for an abscess.

The affections with which aneurism is most likely to be confounded are abscesses, glandular tumors, encephaloid growths, and empyema. The following are the best guides:—

1. Aneurism is always, from the commencement, seated in the direction of one of the large arteries. It is soft and elastic; pulsates more or less violently; is free from pain; and is unattended by discoloration of the skin. Abscess, on the contrary, begins as a hard swelling, and becomes soft only after the inflammation has passed through the earlier stages; if chronic, matter will form very slowly, and although it may surround the artery, and thus receive its impulse, yet the peculiar fluctuation of the swelling, and the changes that may be induced in it by pressure and posture, will always suffice to prevent error. In acute abscess, there are all the symptoms of acute inflammation before fluctuation.

Glandular lymphatic swellings are most common in the neck, axilla, and groin, and, when seated over an artery, may receive its impulse; so with encephaloid growths; but, if on your guard, they are easily distinguished. These tumors, when pressed upon, may seem to pulsate, but if they are grasped laterally with the fingers and raised up from the artery, the pulsation ceases.

2. Aneurism pulsates the moment it is developed—not so with abscesses.

3. In aneurism, the tumor is firmly fixed, any attempt to grasp and raise it up proving abortive.

4. The pulsation of aneurism is generally uniform, being perceived equally at every point of the circumference of the tumor, which rises and falls with the motions of the heart. This is not the case with tumors and abscesses.

5. When an aneurism is firmly and steadily pressed upon, its bulk is diminished, from the expulsion of the blood from the sac. Tumors and abscesses are not diminished by pressure.

6. In aneurism, the tumor is diminished by the artery above, and increased by compressing it below the tumor.

7. The sounds of aneurism are peculiar, but it should be remembered that a tumor, pressing on an artery and diminishing its caliber, may produce similar sounds.

If doubt still exist, after all these points are considered, the exploring needle will probably settle the question.

**Effects and Termination.**—The effects of aneurism are mechanical on neighboring parts; and any organ or tissue, even bone, is destroyed by their constant pressure. Inflammation is often produced, and the function of any organ pressed upon may be destroyed.

**Spontaneous Cure.**—This is of rare occurrence, but examples are occasionally seen. The following are the modes in which it may happen:—

1. By the arrest of the circulation, through the aneurism, by fibrinous clots.
2. Inflammation of the sac, producing coagulation of the blood.
3. Gangrene of the sac.
4. Compression by a tumor on the artery above, or by the sac itself turning over upon the trunk of the artery.
5. By plugging of the artery below the sac by a small, detached clot.

By whatever means the cure is effected, the result is the same: the absorbents set to work, the tumor and contents are gradually removed, and a little, hard nodule alone is left. This process may consume several weeks, or months, according to the size of the aneurism, the state of the part, and the system.

There are three distinct modes by which aneurisms cause death: 1st. By compression on organs. 2d. By rupture and hemorrhage. 3d. By inflammation, suppuration, or mortification.

**Examples of each.**

**Treatment.**—Of internal aneurisms we have little to say under this head, as they belong more to the domain of medicine than surgery.

Of the ancient modes, now abandoned, we need not speak.

**Deligation of the Artery at the Cardiac Side of the Tumor.**—This discovery is due to John Hunter, of England, in the latter part of the last century. He reasoned well about the general principles of the operation, but performed it in a very faulty manner, having applied four ligatures loosely, instead of one small tight one. The patient, however, recovered, and the important principle was demonstrated, that aneurism could be cured by arresting the circulation through it on the cardiac side.

The operation is now well established, and has been much simpli-

fied since the time of Hunter. A healthy portion of the artery is selected; great care is taken in exposing the vessel, to disturb its sheath as little as possible, and only one ligature is employed, which is drawn sufficiently tight to divide the two internal coats; the knot is tied firmly—one end of the ligature cut off near the artery, and the other brought out and retained at one corner of the wound.

The pulsation usually ceases immediately, although sometimes it will continue, though much enfeebled, for several days. The obstruction to the circulation in the latter case is sufficient to allow the blood to coagulate in the sac, and obliterate it eventually. The pulsation in these cases is kept up by the anastomosing branches. When these branches are large or numerous, the circulation through the tumor may be sufficiently active to endanger the success of the operation.

Generally speaking, after this operation, the temperature of the limb sinks below its normal standard; and after a few days, when the vessels dilate, it may rise above this point. In other cases no change of temperature occurs.

**After-treatment.**—This requires careful attention. The limb should be placed horizontally, and kept perfectly at rest. If the temperature is too low, it must be warmly covered, and, if need be, warm applications applied. Opiates may be given, if required, and indications must be met as presented.

**Causes of Failure.**—The causes of failure after this operation are: violent inflammation followed by mortification; death of the limb from deficiency of blood; secondary hemorrhage from premature detachment of the ligature or rupture of the sac; and lastly, continuance of the circulation through the sac by redundant anastomoses. The last accident is the one most likely to occur.

The following statistics, showing the success of these operations, are quoted by Dr. Gross, from Inman, of Liverpool:—

Names of artery.	• Number of cases.	Deaths.	Proportion.
Innominate artery.....	6	6	.....
Subclavian “ .....	40	18	1 in 2
Carotid “ .....	40	11	1 in 4
Abdominal aorta .....	3	3	.....
Common iliac .....	8	3	1 in 2 $\frac{3}{4}$
Internal “ .....	4	2	1 in 2
External “ .....	27	9	1 in 3
Femoral “ .....	42	7	1 in 6
	<hr/> 170	<hr/> 59	<hr/> 1 in 3

**Deligation of the Artery at the Distal Side of the Tumor.**—It sometimes happens that the aneurism is so situated as to render it impossible to tie the vessel on the side of the heart, or it may be forbidden by a diseased state of the artery itself. Bradsor, a French surgeon, supposing that the circulation would by this means be arrested in the sac, and the blood be allowed to coagulate, proposed to tie the vessel on the **distal** side. He did not live to make the experiment; but it was successfully done by others, and particularly by Wardrop, who first succeeded and established its claims. He carried the principle a step further, by tying the subclavian to cure aneurism of the innominate artery, and succeeded in this experiment also. The latter operation, however, seems to be of little value, having failed in almost every case since. The operation of Bradsor, likewise, seems to have but little better success.

**Instrumental Compression.**—The mode of treatment by compression is very ancient, though not applied till recently in a scientific manner. The compression formerly was applied by various contrivances to the tumor itself, and particularly in traumatic aneurism; the result usually was severe pain, inflammation, suppuration, gangrene, and death.

It is needless to enumerate the many experiments which have been made by others, as it is due to Hutton and Billingham, of Dublin, to state that they first laid down proper principles for this mode of treatment, and put it in successful practice.

Previous to the experiments of these gentlemen, it had been supposed necessary that the pressure should be so firm and constant as to inflame and obliterate the artery by adhesive inflammation; but experience has taught that all this is unnecessary, and that the remedy may be applied in a manner far more successful, and far less painful and dangerous. This mode of treatment is now superseding, to a considerable extent, the great discovery of Hunter; but still there will remain a certain proportion of cases which will be best treated by the ligature.

Compression is more particularly applicable to popliteal aneurism, in which it has been very successful. It has also been successfully employed in aneurism of the lower part of the femoral artery, and in those of the brachial, especially at the bend of the arm.

The compression is made at the point at which a ligature would be applied, viz., on the cardiac side of the vessel, at some short distance above the tumor, where the artery is most easily commanded. The compression is applied **gently** and **intermittently**, not firmly and

persistently, as in the old method; just sufficiently to *retard* and weaken the circulation in the sac, not to *arrest* it, and so as to favor the gradual formation of clots, allowing time for the development of the collateral vessels. Occlusion of the artery at the point of compression is not desired; on the contrary, it is better that the vessel should remain as nearly as possible in its normal condition, and pervious. Stratum after stratum of coagula is deposited on the walls of the sac, which is filled by degrees, and with it the upper orifice of the artery. There are some exceptions, where a channel is still left and the blood continues to flow across the sac.

For the purpose of making the compression, a variety of instruments have been contrived, which our limits will not permit us to describe. They may be found in detail in the works of Dr. Gross and others.

In making the compression, it is always important, if possible, to make it opposite to a bone; and during the treatment the limb should be kept well bandaged, from the distal extremity up, to support the capillary circulation. The patient should be dieted, and kept perfectly at rest, and anodynes given when required. If swelling occur, the compression must be removed for a time.

The time necessary for the cure varies much in different cases, from a few days to six or eight weeks, depending on the size of the tumor, the tolerance of compression, and absence of complications.

The statistics of Broca show 116 cures out of 127 cases, the number of deaths not having exceeded half a dozen. If this treatment fail, the ligature, in proper cases, may still be resorted to.

**Digital Compression.**—This mode of compression by the fingers has been successfully applied in a number of cases; its advantages are, that it is less painful, may be applied in some cases where other modes cannot be used, and the time required for the cure is much shorter, being from a few hours to a week.

**Galvano-puncture and injection** are also means which have been used for the cure of aneurism, and although they have both been successful, the objection to them is that they may endanger life from inflammation in the sac.

**Manipulation** is another method recently introduced by Mr. Ferguson, of London, employed with remarkable success in several cases. It consists in forcibly squeezing the sac, breaking up the clots, and permitting them, by change of position, to embarrass the circulation in the sac and artery below. It is liable to the same ob-



jection as the last modes of treatment alluded to, viz., inflammation and its consequences.

**Valsalva's** treatment of internal aneurism consisted in bleeding, starving, absolute rest, etc.; in short, in reducing the circulation to the lowest possible point. It has occasionally succeeded, but very rarely.

#### FALSE ANEURISM.

**False aneurism** consists in a pulsating tumor filled with blood, and connected with an artery, the sac being formed by external tissues, and not by the tunics of the vessel. This term has been very loosely applied to various affections. It should be confined to two forms: one in which an artery alone is implicated, and the other in which an artery and vein are involved. We have already given reasons why the term **diffuse aneurism** should not be admitted.

False aneurism is usually the result of a wound, stab, or puncture, and is more common at the bend of the arm, from the unskillful performance of the little operation of bleeding. The blood escapes from the wounded artery into the surrounding cellular tissue, which is soon condensed into a firm, pulsating cyst, which varies much in size. A spicula of bone, or other cause, may lead to the same result in this or other arteries. The cellular tissue is compressed, more or less inflammation ensues, fibrin is deposited, and a very firm cyst is often formed.

The symptoms and progress of this form of aneurism are very like those of true aneurism.

**Treatment.**—Compression may be tried, and is often successful. If this fail, an incision should be made over the sac, the artery exposed and tied above and below the tumor, as in the case of a wounded artery; the tumor has then been dissected out by some, but it is best to leave it to the absorbents. It is necessary to apply a tourniquet previous to this operation.

#### VARICOSE ANEURISM.

The **arterio-venous aneurism**, generally called **varicose aneurism**, consists of a sac filled with blood, lying between an artery and vein, and communicating with both. The most common site of this, like the last form of aneurism described, is the bend of the arm, and from the same cause, viz., venesection; the vein being completely transfixed, and the artery punctured by the lancet. It may occur in other parts of the body, from wounds or ulceration. No matter how it is formed, the cyst is usually of small size, seldom equaling in bulk a pullet's egg; it is composed of cellular tissue and plastic matter, and

is often very thick and firm; it does not cause much pain, but stiffness and numbness. The opening of communication between the two vessels is very small, and the blood rushes through with a peculiar whizzing or purring sound; it is perceived both by touch and ear, and may be regarded as a satisfactory pathognomonic symptom. The sac rarely contains fibrinous clots, and on laying it open, is often found to be smooth and white like the interior of an artery. It seldom undergoes spontaneous cure, and may exist for years without increase or much inconvenience.

**Treatment.**—When the tumor is small, and gives little inconvenience, it is best not to interfere. When it calls for relief, it must be cut down on, and the artery tied above and below the opening without interfering with the sac, which must be left to the action of the absorbents lest phlebitis should ensue.

#### ANEURISMAL VARIX.

**Aneurismal varix** consists in a direct communication between a contiguous vein and artery without the intervention of a sac; in the last particular it differs essentially from the varicose aneurism. It has none of the characters of aneurisms, and should not have been classed with them, as is customary. It has the same cause as the last-named injury; is most common at the bend of the arm, but may occur wherever an artery and vein are contiguous. The opening between the vessels is very small, and the orifices of the two are glued firmly together by adhesive inflammation; the vessels are also firmly adherent for some distance beyond the point of communication.

There is an incessant interchange and commingling of the two kinds of blood; the vessels undergo important changes, the vein assuming the characters of an artery, and the artery those of a vein. The vein becomes greatly distended for some distance above and below the point of communication, and its coats greatly thickened; the artery, on the contrary, is diminished in caliber and the thickness of its coats; owing to the blood passing from the artery into the vein, the latter pulsates like an artery, while the pulsation of the artery is enfeebled. At the seat of injury there is a purring sound like that described in varicose aneurism.

**Treatment.**—This malady gives so little inconvenience that it rarely requires treatment; if any should be demanded, it is the same as for varicose aneurism.

#### ANEURISM OF PARTICULAR ARTERIES.

**Aneurism of the Innominate Artery.**—It may exist alone, or be associated with aneurism of the arch of the aorta, the carotid, or sub-

clavian; it may be very small, or enormously large and tubular, fusiform, or sacculated. Sometimes it is limited to the middle of the vessel; at others it involves one or both extremities.

**Symptoms.**—Aneurism of the innominate usually begins as a small tumor at the right sterno-clavicular articulation, between the trachea and inner margin of the mastoid muscle, immediately above the inner third of the clavicle. The tumor is at first very small, circumscribed, and movable on pressing the finger down into the hollow at the top of the sternum.

The growth is usually rapid, extending upon the neck and to either side, particularly to the right, where there is least resistance. As it advances it pushes forward the muscle, and even the bony articulation, forming a large prominence, pulsating violently beneath the skin. Now and then it escapes from the chest, and advances a considerable distance up the neck, presenting an hour-glass shape.

The effects upon neighboring structures are striking, and give rise to great distress. The pressure upon the subclavian weakens the force of the circulation at the wrist, and sometimes arrests it entirely. The circulation is occasionally irregular and intermitting in this arm. The circulation of the right carotid may be affected in like manner. Compression of the tumor on the veins often produces œdema of head, face, and arm.

The trachea becomes pressed upon and displaced, and the difficulty of breathing becomes so distressing that the patient is unable to lie down. Dyspnœa, however, is less frequent from aneurism of the innominate artery than that of the arch of the aorta, which is explained by their anatomical relations. The œsophagus is also sometimes pressed upon, and deglutition interfered with. When the aneurism occupies the inferior part of the artery, its pressure is downward on the heart, arch of the aorta, and vena cava, compressing them, and interfering with their functions.

Pressure of the tumor on the **nerves** of the neck and chest induces not only pain and cough, but dyspnœa and dysphagia; the two latter symptoms not being necessarily dependent on compression of the trachea and œsophagus. Compression of the pneumogastric, phrenic, laryngeal, and sympathetic will readily account for the symptoms alluded to.

Effect of pressure on bones.

**Diagnosis.**—This is sometimes extremely difficult, as aneurism of the innominate may be confounded with those of the arch of the aorta, carotid, or subclavian. Fatty, fibrous, and encysted tumors, situated about the root of the neck and behind the sterno-clavicular articula-

tion, receiving the impulse from the innominate or aorta, may simulate this aneurism. A doubt may arise even in the case of anæmia, where the pulsation of the innominate and aorta are inordinate, though there is no dilatation. The difficulty in such cases is much increased in fat subjects. By strict attention, however, to the symptoms before laid down, a satisfactory diagnosis may usually be made.

The **prognosis** is very unfavorable; death ensuing from bursting externally or internally, or from pressure on the trachea and surrounding parts.

**Treatment.**—The only chance of success is from tying either the carotid, subclavian, or both. The success of any one of these operations is unsatisfactory, but the ligature of the carotid gives best promise, two out of eleven having recovered.

**Aneurism of the Common Carotid.**—It may occur at any point of its course, but is most frequent about the middle portion. Like other aneurisms, it commences in a very small, pulsating tumor of rounded shape, and usually without any known cause. The surgeon rarely sees it until it has acquired the size of a pullet's egg, the patient having most probably taken it for swelling of a gland. Its pulsation, thrill, and bellows sound, however, reveal its true nature. Pressure on the cardiac side of the aneurism, by stopping its circulation, arrests these symptoms, and causes a diminution in the size and consistence of the tumor, while pressure upon the distal side produces an opposite result. When small it is easily moved about, but as it increases it becomes more firmly fixed.

The tumor, as it enlarges, produces more and more inconvenience by pressing on the trachea, the nerves, and soft parts around, and by obstructing the return of blood from the brain by pressure on the veins.

Carotid aneurism may be confounded with diseased lymphatic glands, abscesses, encysted tumors, goitre, dilatation of the internal jugular vein, and aneurism of the innominate and aorta. The diagnosis often requires much caution.

**Treatment.**—The treatment of this aneurism is usually conducted on the Hunterian principle, by tying the artery on the cardiac side, when there is sufficient space for the operation. If the tumor is low down we resort to the operation of Bradsor, by tying the artery on the distal side of the tumor. Treatment by compression is here inapplicable on account of the arrest of the return of the venous blood from the brain. These operations have been performed with gratifying results, a very large proportion having been successful.

**Aneurism of the Subclavian.**—This is almost as common as that of the carotid. It may affect any part of the artery, but is most common beyond the *scaleni* muscles, just before it becomes the axillary. The form of this aneurism is much influenced by the compression of the surrounding muscles and other tissues.

As the tumor enlarges, it encroaches upon and compresses the surrounding parts, causing pain, œdema, elevation of clavicle, dyspnoea, dilatation of the veins of the neck, chest, and upper extremity, and numbness, or even paralysis. At first movable, it after a time becomes firmly fixed. To the hand and ear the peculiar thrill and sound of aneurism are revealed. This aneurism has been confounded with those of the innominate and aorta, and with various tumors and abscesses. The vessel has actually been ligated by mistake for aneurism when none existed.

The history of the tumor, and its situation at the side of the neck, just above the clavicle, with the symptoms peculiar to aneurism, will generally enable us to avoid such blunders. When the tumor is within the *scaleni* muscles, it is situated behind the mastoid muscle, and extends toward the middle line of the neck. When it commences on the outside of the *scaleni*, the situation of the tumor will be behind the mastoid muscle. If the position and symptoms of aneurism of the innominate artery be remembered, we may usually, in the early stage, make a clear diagnosis between them. Like other aneurisms, its effects depend much upon the parts compressed in its course.

**Treatment.**—If not arrested by art it is almost necessarily fatal, nature being rarely equal to a cure, and our art is not more potent than nature. Ligation of the innominate has been tried without success. There is rarely any space left of the subclavian itself for a ligature, and if there is, the artery is almost certain to be too much diseased to bear it.

**Axillary Aneurism.**—Less frequent than the subclavian. Size of the tumor may reach the size of a foetal head.

**Symptoms.**—These are mostly well marked. It presents all the ordinary symptoms of aneurism, and there being no other large vessel near, the diagnosis is easy.

**Treatment.**—The only remedy is ligation of the subclavian artery, and the sooner the better.

**Aneurism of the Brachial Artery and its Branches.**—Spontaneous aneurism of these arteries is extremely rare, for the reason that they are little liable to those degenerations so common to the large arteries. They are, however, all subject to traumatic aneurism, particularly from venesection, as before stated. The treatment of them, as well as wounds of these arteries, have already been spoken of.

“Wounds of the arteries of the hand, especially of the palmar arch, are best managed by free incision, and the application of two ligatures.” The compression, direct or indirect, is a useless loss of time. The bleeding returns when the support is removed, more blood is lost, the parts become inflamed and swollen, and the application of ligatures much more difficult of application. The ligation even of both the radial and ulnar arteries in the forearm is often not sufficient to arrest the hemorrhage, the interosseous and other anastomosing branches still keeping up the supply of blood to the wounded artery. The brachial artery has been often tied to arrest hemorrhage from the palmar arch, but rarely with success, as the anatomist might expect.

**Aneurism of the Common Iliac.**—This affection is fortunately extremely rare, as we have no remedy for it. The aorta has been tied five times with the hope of relief, but all the subjects died.

**Aneurism of the Internal Iliac.**—Also rare, and, like the last, difficult of diagnosis.

**Aneurism of the External Iliac.**—Very rare. May be seated at any part of the artery, but generally is low down, and has a tendency to pass beneath Poupart's ligament, into the upper part of the thigh. It presents all the ordinary symptoms of aneurism, attains very great size, and displaces the parts around. In thin subjects, by compressing the abdominal aorta with the hand, the size of the tumor is diminished, and the pulsation arrested. The diagnosis, however, is not always easy, and the common iliac has been ligatured for tumors over the artery, instead of aneurism. There is numbness and swelling of the limb, with much discomfort.

**Treatment.**—Deligation of the common iliac, or of the upper part of the external iliac, where space permits, is the only remedy. Compression with the fingers, of the iliac where it passes over the brim of the pelvis, has been recommended, and, I believe, practiced in one

case, that of Dr. Nichols, with success. The ligature has met with sufficient success to justify the operation in proper cases.

**Aneurism of the Femoral Artery.**—This is more common than those of the iliacs, though not so frequent as the popliteal. The superior third suffers more than other parts of the artery. Sailors are said to be more subject to this form of disease than others, from the mechanical injury they are exposed to.

**Diagnosis.**—This is generally, though not always, easy. Abscesses, and various morbid growths—solid, semisolid or fluid, and malignant and non-malignant—are the affections with which it is most liable to be confounded. The best diagnostic, where space permits, is compression above the tumor. If the tumor is aneurismal, the compression will arrest the pulsation, thrill, and sound, and permit the tumor to be diminished by compression. Where doubt still exists, a very fine exploring needle may be used.

The femoral artery, at its upper part, may be pushed forward by a **synovial bursa**, situated behind the psoas muscle, just below Poupart's ligament, which may receive an impulse from the artery. If the thigh be flexed upon the pelvis, the tension is taken off from the muscle, and the pulsation arrested. There are a great many lymphatic glands on the upper part of the thigh, over the artery, and, when enlarged, these have been mistaken for aneurism.

**Psoas abscess** has also been mistaken for aneurism, but the history of the case and symptoms are very distinct; if a patient with this abscess be laid down, and the pelvis elevated, the tumor can easily be made to disappear by a little pressure.

**Treatment.**—This aneurism may be cured generally by properly-managed compression, either with the fingers or mechanical apparatus. Where this fails, the artery should be ligated, and the operation is one easily performed.

**Popliteal Aneurism.**—After the thoracic aorta, this is the most usual point of aneurism, and is spoken of by writers as of frequent occurrence. It is, however, very rare in our part of the world, as I have seen or heard of but one case in Alabama, during twenty-five years I have been practicing surgery in Mobile. It almost invariably occurs in males, and beyond the middle age of life, and is most general among the laboring classes. In its early stage, being small and deep seated, the diagnosis may be difficult; but when it has reached a certain magnitude, it is rarely to be mistaken. I have, however, seen a no less distinguished surgeon than Dr. Stone, of New Orleans,

plunge a bistoury unexpectedly into a popliteal aneurism, and be compelled at once to apply a ligature to the femoral above. In this case the doctor diagnosed an abscess, in which he was correct, but not discovering the aneurism, and the abscess being superficial, the bistoury passed through the abscess and into the aneurismal sac, from which the blood spouted forth. The tumor is seated at the bend of the joint, behind the knee, and in the hollow between the outer and inner ham-string muscles, and presents all the symptoms of aneurism already described. The leg is bent, and there is numbness, pain, and swelling of the limb below. It has been confounded with abscess, tumors, bursæ, etc. The progress of the disease is like that of other aneurisms. The Hunterian operation, till recently, has been the only reliable remedy, but is now being superseded by compression, which has been remarkably successful in these cases.

#### ANEURISM OF THE ARTERIES OF THE LEG AND FOOT.

These are exceedingly rare, particularly in the spontaneous form. The traumatic form occasionally occurs, and when affecting the posterior tibial, is extremely difficult to get at, from the great depth of the vessel.

Injuries of the arteries of the foot, followed by troublesome hemorrhage, are often exceedingly embarrassing to the surgeon, and require all his self-possession and anatomical knowledge. The anastomoses of the arteries, like those of the palm of the hand, are so free that the surgeon's work must be thoroughly done to put an end to the trouble. Experience has proved that compression cannot be relied on but in exceptional cases. The rule is, that the plantar arteries, when divided, will bleed till ligatured, and they should therefore be commanded by this remedy at once. An ugly wound is required, and the operation is often troublesome, but the necessity still exists; it is absolutely necessary, too, that both ends of the artery should be tied.

It has been recommended to cut down upon the large arteries of the leg, or even the femoral, in such cases, but such a procedure cannot be too strongly condemned. The experiment of tying both tibial arteries has been tried again and again, and almost always without success.

Sometimes we may resort to the expedient of compressing the anterior and posterior tibial arteries by means of two pieces of cork placed directly over the vessels, opposite the malleoli, and bound down firmly by a bandage.



## OPERATIONS ON ARTERIES.

**Ligation of the Innominate or Brachio-Cephalic.**—I think it needless, in a course like this, to waste time on an operation which has always failed, and promises no success for the future.

**Ligation of Common Carotid.**—There are two points in its course at which a ligature may be applied, at its upper or lower part. As the artery proceeds upward, it is overlapped by the sterno-mastoid, sterno-hyoid, and sterno-thyroid muscles, and crossed by the omohyoid toward its superior extremity. Running down in front of its sheath is the *descendens noni* nerve, a little thread-like filament, easily recognized by its whitish appearance, while within the sheath are, on the external side of the artery, the internal jugular vein, and behind and between them the pneumogastric nerve; the sympathetic and recurrent nerves being posterior to the sheath. All these parts are in close proximity, and require great caution in separating them before the ligature is applied. The difficulty of the operation is sometimes much increased by overlapping and distention of the vein, thus concealing the artery. This is best remedied by requesting an assistant to compress the vein at its upper and lower parts, having first stripped out the blood.

It sometimes happens that the common carotid is wanting, two branches coming off and running parallel, thus forming the external and internal carotids; or the common carotid may bifurcate lower down than usual: but these and other irregularities must be met as they present themselves, which is not often.

In ligating the artery, the patient should lie on his back, with the head inclined to the opposite side, and well supported by pillows; the shoulders should be elevated and the neck well exposed.

The artery is easily exposed in the lower part of the neck, by making an incision, from two and half to three inches in length, along the inner border of the sterno-cleido-mastoid muscle, commencing far above the clavicle. The skin and platysma myoides being divided, a portion of the cervical fascia is pinched up with the forceps, and opened transversely sufficiently to admit a grooved director, upon which it is then slit up to the extent of the outer incision. Two retractors are then inserted to draw the parts asunder. The sheath of the artery being thus exposed, a small portion is raised with the forceps, and divided horizontally, when the director being

introduced, it is slit open so as to denude the artery to a small extent and enable the operator to isolate it from the jugular vein and pneumogastric nerve, the ligature being passed from without inward. Any superficial vein lying in the way must be pushed aside.

The artery being of more easy access in the upper than lower part of the neck, this should if possible be selected for ligation. To expose the vessel in this situation, an incision should be made along the inner margin of the mastoid muscle, commencing a little below the cricoid cartilage and extending nearly to the angle of the jaw above. The same layers are cut through as in the last operation, for the exposure of the artery, and the ligature is passed in the same way around the artery, from without inward. The omo-hyoid muscle crosses the sheath of the vessels at this point, serves as an important guide, and must be held aside. The common carotid has been tied for various other reasons than the cure of aneurism, viz., for arresting hemorrhage from wounds; as a preparatory step in the extirpation of tumors; to prevent hemorrhage; for the cure of epilepsy; for the cure of erectile tumors, etc.; and the details of these operations present many points of interest and instruction.

**Ligation of the External Carotid and its Branches.**—The external carotid is situated in the triangular space formed by the omo-hyoid muscle below, the digastric above, and the sterno-mastoid externally and immediately below the platysma myoides; it extends from the upper border of the thyroid cartilage to the neck of the lower jaw; as it passes up, it sinks deeper, and dips beneath the stylo-hyoid and digastric muscles, and is finally buried in the substance of the parotid gland. It is accompanied by two veins, and is crossed near its commencement by the hypoglossal nerve, and in various parts of its course by branches of the external jugular and other veins. The glosso-pharyngeal nerve passes between this artery and the internal carotid, while the superior laryngeal nerve lies underneath.

This artery rarely requires a ligature for anything else than wounds or vascular growths about the head and face. A ligature is easily placed around it, in the first part of its course, by making an incision along the inner edge of the sterno-mastoid muscle, commencing opposite the middle of the thyroid cartilage, and extending it two inches up to the angle of the jaw. The trunk of the common carotid will serve to direct the finger to the point of bifurcation; where it lies beneath the digastric and stylo-hyoid muscles, the artery is exposed with more difficulty, and requires cautious dissection.

The branches of the external carotid likely to require ligation are the superior thyroid, lingual, facial, occipital, and temporal; and if you make yourself well acquainted with their anatomical relations, little difficulty will oppose you.

**Ligation of the Subclavian Artery.**—Although one of the most important operations in surgery, it is by no means the most difficult to one who understands well the anatomy of the parts. The point which is usually selected for the operation is just external to the scaleni muscles, where it lies upon the first rib. For the operation the patient should be placed in a recumbent position, with the shoulders and head elevated, and the latter turned to the opposite side. An assistant takes hold of the hand of the affected side, holds it close to the side, and draws the shoulder down in order to press the clavicle as much as possible downward, which has the effect of making the artery more superficial.

The surgeon then, standing beside the patient, places his left hand upon the chest below the clavicle, draws the integuments downward, holds them firmly, while he makes an incision, about two inches and a half long, directly along the middle line of the clavicle, commencing at the clavicular origin of the mastoid muscle, and terminating near the anterior margin of the trapezius; in this manner the skin, platysma myoides, and superficial fascia are divided. Letting go the parts, the skin will resume its natural position, and the incision be found along the upper margin of the clavicle. The next step is to work your way gently with the *handle* of the knife through the deep-seated fascia and cellular tissue. The external jugular vein will be found close to the external border of the mastoid muscle, and must be pushed aside. The supra-scapular artery will usually be found along the inner border of the clavicle, and must be carefully guarded; if divided, it should be immediately tied.

The finger is then introduced into the wound, the anterior scalenus muscle felt for, which is easily found; the finger is next placed on the outer edge, and glided along down to the first rib, where the tubercle is felt, and the artery pulsating immediately behind, where it may be easily tied by passing a ligature beneath, and from before backward. Before tightening the ligature, you should be sure that it controls the circulation which feeds the aneurism, and that you have not included a branch of the axillary plexus of nerves. If the mastoid muscle is very broad, it may be necessary to divide some of the fibres of the clavicular portion. Where the aneurism is very large, the operation is sometimes rendered more difficult, by the elevation of

the clavicle. The clavicle is naturally more elevated in some subjects than others, and the operation is also much more difficult in fat subjects, and those with short necks.

The operation is sometimes embarrassed or rendered useless by a diseased state of the artery at the point of ligation. In this case it may be necessary to divide the anterior scalenus and tie the artery higher up. The operation is usually more or less interfered with by interposing blood-vessels. The external jugular vein and supra-scapular artery, in their normal position, stand directly in our way.

It occasionally happens that the subclavian vein is so distended as to interfere greatly. This vessel is situated lower down usually than the subclavian artery, and in front of the scalenus, while the artery is behind.

This operation is one which requires to be studied out in detail, for while the artery is easily reached in the normal state of the parts, there are many circumstances that embarrass the operation.

**Ligation of the Axillary.**—This is required principally for penetrating wounds or rupture of the artery. It may be secured just below the clavicle, or in the axilla. These are both rare operations. The operation above the clavicle is easier to perform than the one below, and I should take the operation just described, almost universally, in preference to the one below the clavicle. The operation in the axilla may, in rare instances, be called for, and the artery is got at by abducting the arm, making an incision along the center of the hollow of the axilla, near the latissimus dorsi muscle. The median nerve and axillary vein first come into view, the two roots of the former embracing the artery on each side, and the latter running along its anterior surface. These must be cautiously pressed aside and the artery brought into view.

**Ligation of the Brachial.**—This artery has to be ligated more frequently than any other, and fortunately is one of the easiest to get at. To secure it high up, an incision, two inches and a half in length, should be made along the inner margin of the coraco-brachialis, the arm being extended and supinated. The artery is accompanied by two veins, and here lies between the median and ulnar nerves, the former being on the outer, and the latter on the inner side. In the middle of the arm the artery is easily reached by an incision along the inner border of the biceps; the median nerve here usually lies on the inside and in front of the vessel. At the bend of the arm the artery is readily exposed, by making an incision through the skin and aponeurosis at the inner edge of the biceps tendon.

It would be a useless consumption of time to go over in detail the application of ligatures to all the arteries. These operations may be turned to in any of your surgical books, and will be shown you in the course of our lectures.

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### INJURIES AND DISEASES OF VEINS.

**Wounds** of veins are rarely accompanied by danger, and require much skill in treatment. The color of the blood, and the manner in which it flows, usually declare the kind of vessel that pours it forth. Where the veins are large and beyond the reach of ligature or compression, the hemorrhage is often fatal; in the smaller veins, whether the vein be wholly or partially divided, nature generally arrests the hemorrhage, though sometimes after too much blood is lost. There is not only danger from loss of blood, but from inflammation of the vein, as occasionally happens from a foul lancet or other cause.

**Treatment.**—In wounds of veins, a compress and bandage is ordinarily all that is required, together with rest and position. A vein should never be tied if the operation can be avoided, as these vessels are much more liable to serious inflammation than arteries. This, however, often becomes necessary.

### DISEASES OF THE VEINS.

**Phlebitis**, or inflammation of the veins, is sometimes an idiopathic affection, but generally is the result of injury. It frequently follows surgical operations and other wounds, in which case it is apt to cause pyemia, or multiple abscess, a fatal form of disease. Phlebitis is not only more common than arteritis, but is more apt to terminate in suppuration; another peculiarity of phlebitis, is its tendency to extend along the vessel toward the heart; this affection may be confined to one vein, but usually affects several. It may be also acute or chronic.

**Acute Phlebitis.**—The symptoms of this affection are not always well marked. When the affected vessel is superficial, its course is indicated by a corresponding red line, which, on applying the finger, feels like a hard cord; exquisitely sensitive to the touch, and reaching as high as it can be traced. The color is more or less red, and soon becomes diffused over the surrounding parts, presenting all the characters of erysipelas; swelling and pitting accompany it. The pain is severe.

The constitution always deeply sympathizes, even in the cases where the disease is limited in extent. The disease is ushered in by rigors, flushes of heat; the pulse is frequent, quick, and irritable; skin hot and dry; nausea; constipation, and scanty urine. Adynamic symptoms soon set in; excessive prostration, delirium, jaundice, great restlessness, are usual attendants.

**Anatomical characters.**

**Treatment.**—Where it involves only the superficial veins, it often yields to the antiphlogistic treatment, together with local application of blisters, iodine, etc.

**Chronic Affections.**—Chronic inflammation of veins differs greatly from the acute form. The coats become so much thickened as to resemble those of an artery. The surface of the vein does not present the vivid redness and other marks of acute inflammation. The surface is rough and shriveled; the inflammation sometimes passes on to **ulceration**, but this is more rare than in the arteries; sometimes the coats are eaten through, and fatal hemorrhage ensues. These ulcers may be solitary or numerous.

Chronic phlebitis is most common in the lower extremities, in the veins of the spermatic cord, and those of the rectum. The symptoms are those of inflammation in the chronic form.

The treatment is antiphlogistic, and it is important to remove the cause.

**Obliteration** of veins is not an unfrequent result of inflammation, compression of tumors, etc.

Loose concretions, **phlebolites**, or vein stones, as they are termed, varying in size from a currant to a pea, are occasionally found in the veins; commonly of a yellowish, brownish or bluish color, they are of a hard and brittle consistence, and oblong, oval or spherical form, with a smooth and even surface. When divided, they are found to consist of concentric lamellæ, around a nucleus, frequently consisting of fibrin. There are sometimes as many as twenty or thirty of them; they are generally found in the smaller veins; they are more often seen in varicose veins, and consist of carbonate and phosphate of lime, with animal matter.

**Varix.**—A varicose or enlarged state of the veins in the lower extremities is very common, particularly among the laboring class and those who are much in the erect posture. The veins of the spermatic cord, vulva, scrotum, and rectum are the usual seats of this affec-

tion, which is rarely seen in the upper extremities. In the spermatic veins it is most common in young subjects, while the hemorrhoidal veins and those of the leg are most often affected in the middle and later years of life. The veins, in this affection, are preternaturally large, tortuous, knotty, and convoluted, or as if they were folded on themselves, being increased both in diameter and length, and pursue a singularly serpentine course. Their coats are much thickened and condensed, elastic, and rolling under the finger like cords. In some points they are thin and dilated into pouches, and often give way, pouring out large quantities of blood.

On being opened, the surface is found rough and sacculated irregularly, strong bands being sometimes stretched across their interior, which divide the tube into small cells, occupied by coagulated blood, phlebolites, or fibrinous concretions, in a state of organization. The valves are often broken down, or thickened, indurated, and displaced; occasionally a vein is obliterated, and all the above changes are results of inflammation.

**Causes.**—Obstruction of the veins, however produced, is a common cause; pregnancy, from the pressure of the gravid uterus on the large veins of the pelvis; tight garters, drawers, or stockings, or even the erect posture habitually maintained, may produce it. Varix of the rectum is generally the result of constipation and straining at stool. The cause of varicocele is not well understood.

The **effects** of varicose veins vary much, according to situation. In the legs, from the length of the veins and gravitation of the column of blood, it is productive of a good deal of pain and discomfort, of tumefaction of the skin and cellular tissue, and more or less tenderness along the track of the vessel. In the aggravated forms, ulceration often occurs in the skin, commencing at a small spot and extending to considerable size, and is called **varicose ulcer**; it is difficult to heal, and the ulceration sometimes extends into the veins, causing hemorrhage.

In the spermatic veins, the disease may give rise to atrophy of the testicle and distressing neuralgic pains. In the hemorrhoidal veins, it gives rise to piles and other disagreeable symptoms.

The progress of varix is generally, though not always, slow. In pregnant females, during the last months, this varicose condition often comes on rapidly, and to great extent. The disease is also occasionally developed rapidly in the spermatic and hemorrhoidal veins.

In the lower extremity it may remain stationary for years, and in

some cases spontaneous cures take place by adhesive inflammation. On the other hand, this affection leads sometimes to ulceration, abscess, violent erysipelas, etc. Varicocele and varix of the hemorrhoidal veins never prove fatal, but give rise to much discomfort and suffering.

**Treatment** is either palliative or radical. The cause must be removed. Onanism is one of the causes of varicocele; and constipation, of varix of the hemorrhoidal veins. In varix of the lower extremity all impediments to the circulation must be removed, and artificial support given by suspensory bandages, laced stockings, etc. An active purge occasionally is beneficial, in unloading the portal circulation. In plethoric persons, the lancet sometimes gives much relief.

For the **radical** cure of this disease many operations have been devised, most of which are not worth alluding to. The ligature and caustic seem now to be most relied on for cure. As veins inflame more easily than arteries, the patient should always be carefully prepared for it, by rest, diet, position, local remedies to remove irritation, purging, etc.

“The operation with the ligature is either direct, as in piles, or subcutaneous, as in varicocele, and in either case it is safe and effectual.” (*Gross.*)

The ligature requires to be drawn tightly, in order to obliterate the vessel. Of hemorrhoids we shall speak elsewhere. In varicocele, a stout spear-pointed needle is used; the veins are drawn aside from the spermatic duct, and the needle passed through the integuments behind them, and brought out at the opposite point of the integuments; the needle is then passed in at the opening from which its exit was made, carried in front of the veins, and then brought out at its point of entrance; the two ends are then tied firmly, embracing and strangulating the isolated veins of the cord.

In operating on the lower extremities, Dr. Gross gives a decided preference to the issue prepared with equal parts of caustic potash and quick-lime, carefully incorporated and converted into a thick paste with alcohol. Of this, a portion of the size of a three-cent piece, and a line or two in thickness, is placed directly over the enlarged and tortuous vessel, at intervals of three, four, or five inches, and allowed to remain fifteen minutes, by which time a deep eschar is formed. The paste is now removed, and the parts washed with vinegar, to neutralize the alkalies, and a poultice applied. The cure is sometimes tedious, from the difficulty of curing an issue of this kind, but the remedy “is entirely free from danger, and is always perfectly successful.” (*Gross.*)



The other mode of treating varicose veins of the lower extremities is by pins passed beneath the vein, and then winding a thread firmly around the pin, so as to constrict the vein.

Authors differ greatly as to their estimate of these two operations, and the encomiums passed on the caustic by Dr. Gross are much higher than the opinion of the profession generally would justify. The obliteration of veins, by any operation, (though it may be free from danger,) is unsatisfactory, as the disease is almost certain to return in the lower extremities,—the **cause**, whatever it may be, not being reached by the operation.

**Introduction of air** into veins is a serious accident, which sometimes occurs in operations, particularly those about the neck. An opening being made into one of the jugulars or subclavians, the air, during inspiration, rushes into the circulation, and death has been the consequence within half an hour.

The symptoms are very like those of cerebral apoplexy, and the patient dies in coma.

**Treatment.**—There is nothing satisfactory under this head. The important point is to prevent the ingress of air.

#### AFFECTIONS OF THE CAPILLARIES.

These vessels are liable to enlargement or hypertrophy, which may be confined to the arterial capillaries, the venous, or may involve both. This affection is usually congenital, and results in a tumor, acquiring often great bulk.

**Arterial Tumors.**—The only arterial tumor of this class is that so well described by John Bell, under the name of **Aneurism by Anastomosis**.

The most common sites are the scalp, lip, nose, orbit, eyelid, cheek, and chin, but may occur in any part of the system. It is situated in the cellular tissue.

This tumor consists essentially of a net-work of arteries and veins, closely connected together by cellular or cellulo-fibrous tissue. It may commence in a speck not larger than a shot, and rapidly acquire large size. The arteries are singularly convoluted, and, in cases of long standing, may acquire the caliber of a goose-quill. The coats of the arteries are thin and sacculated. The arteries around the tumor, to some distance, are enlarged also. The general disposition of the veins is similar to that of the arteries, but usually they are less capacious, and their circulation sluggish. The intervening cellular

tissue becomes much developed, condensed, and hardened into a celulo-fibrous consistence. The tumor has no proper envelope. In general, the surface of the tumor is of a reddish-scarlet hue, with here and there a purple spot, and so transparent as to allow many of the enlarged vessels to be seen through it.

Of the causes or origin of these tumors we know little; their development is commonly very slow, but sometimes rapid; as stated, it is usually, if not always, congenital, commencing as a nevus, or mother-mark.

The tumor has generally an irregular outline, and rarely projects more than six or eight lines beyond the level of the surrounding parts. It is soft and compressible, the finger sinking into it like wet sponge; but when the finger is removed, the skin regains its position. The color varies in different cases. When it occurs on the skin, or skin and cellular tissue, it is generally of a reddish hue, inclining to scarlet. In old cases, and when it lies beneath mucous membrane it is more commonly bluish or purplish. It beats and throbs synchronously with the contraction of the heart, and imparts an aneurismal thrill to the finger.

These tumors sometimes ulcerate and slough, causing hemorrhage, and even death.

The remedies recommended are excision, escharotics, strangulation, injections, starvation, and amputation.

**Excision.**—This may be practiced best in small arterial tumors, before there is much development of the surrounding arteries; where, however, there is much pulsation in the tumor and arteries feeding it, we may look out for hazardous hemorrhage if excision be attempted, and should be prepared to meet it.

When it is determined to extirpate the tumor, it must be done by cutting *around*, and not into the tumor. The operation must be done rapidly, and a good assistant at hand to compress bleeding arteries, till they can be tied. If there is one main artery feeding the tumor, it should be tied at the outset. In certain cases, as in the lip, face, etc., ligatures may sometimes be dispensed with, by approximating the edges of the wound by the twisted suture.

Small arterial tumors may often be destroyed by **escharotics**, of which the Vienna paste is among the best. The paste is kept applied for fifteen minutes over the whole surface, and followed by an emollient poultice; the resulting ulcer is treated on general principles. When the tumor is very large, it may be attacked at several points at once, or in succession. The caustic should not be used where it is desirable to avoid an ugly scar.

**Strangulation** is another mode of treatment, which may be effected by passing one or two threaded needles through the base of the tumor, and then tying the ligature tightly around. These may include the skin, or may be passed subcutaneously.

By **starvation** is meant an arrest of circulation, by tying the arteries which feed the tumor. This plan, however, has not led to satisfactory results.

**Injections** of various kinds into the vascular tumor have been tried—such as nitric acid, creosote, iodine, tannin, perchloride of iron, etc. The fluid is introduced in small quantity with a delicate syringe. I have used the perchloride of iron in several cases of this kind, and with success. Professor Gross prefers the persulphate of iron as “the only really unobjectionable injection for the cure of this disease,” but why I cannot explain. The perchloride is now in general use. This is the mode of treatment I think safest, simplest, and most effectual in the majority of cases.

Other remedies, as **heated needles**, the **seton**, **compression**, have been recommended, and may, under certain circumstances, be brought into play.

#### VENOUS TUMORS.

There is a class of tumors designated by the above term, composed principally of dilated veins and cellular tissue; they are situated, for the most part, on the scalp, cheek, lip, and chin. The submucous cellular tissue of the mouth, tongue, and vulva are also occasional seats; and many of these latter cases resemble very much one of the forms of hemorrhoidal tumor. They vary very much in magnitude. Its color is chiefly purple or claret, or intermixed with various shades of these. It is soft and spongy, diminishing under pressure. It is *free from pulsation or sound*. It is usually congenital—the growth generally, though not always, slow. It may go on enlarging, till, finally, inflammation, ulceration, and hemorrhage may ensue, which may be controlled easily by pressure.

The structure of these venous tumors is almost identical with that of the arterial last described, except that in the one veins predominate, and in the other, arteries. The veins, on dissection, present much the appearance of varicose veins in other parts of the system.

Venous tumors are generally best managed by excision, and, except in some of those of very large volume, the operation is almost bloodless, contrasting, in this particular, very strongly with the “aneurism by anastomosis.”

Where the knife is objected to, the subcutaneous injection of a few

drops of a strong solution of the persulphate or perchloride of iron will readily cause their disappearance. They may also be safely relieved by strangulation with a ligature.

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### DISEASES AND INJURIES OF JOINTS.

Joints are liable to incised, punctured, lacerated, and other wounds, like other parts.

**Symptoms.**—When a joint is penetrated, there is a discharge of synovial fluid, rapidly followed by great pain, tension, and swelling of the part, with severe constitutional disturbance. When the wound is large, as from gunshot or other violent cause, the system receives a great shock, which is evinced by pallor, feeble pulse, sinking, etc. It is generally some hours before reaction follows; intense inflammation in the part rapidly develops, and frequently of an erysipelatous character; the discharge of synovial fluid increases in quantity and consistence, exhibiting a thick, ropy appearance; or, if the wound be closed, the synovial sac becomes distended, and the parts around œdematous, and fluctuation is felt.

The sensation next assumes a puriform character; the patient is seized with rigors; alternate heats and sweats occur; the joint becomes very tense; the constitutional irritation runs exceedingly high; ulceration takes place; the integuments are perforated, and a fetid, purulent discharge follows; the cartilages, bones, and ligaments all become involved in destructive ulceration. Occasionally the inflammation and suppuration extend to the surrounding cellular tissue.

The above description is applicable to the majority of wounds of large joints; but, on the other hand, by prompt treatment, the inflammation and its consequences in many cases is prevented, the patient recovering in a short time, with the exception of temporary stiffness of the joint.

All wounds of large joints are, however, to be regarded as serious injuries, but the gunshot and lacerated are much more grave than the simple incised. The danger or difficulty in these cases depends upon the size of the joint, and the extent and kind of wound.

**Erysipelas, Pyemia, Tetanus, and Hemorrhage** are frequent complications of these injuries.

**Treatment.**—This is sufficiently obvious, as these wounds are to be treated on the same principles as others. The edges of the wound

are to be brought accurately together; all foreign substances removed; position and absolute rest enjoined; and the antiphlogistic treatment strictly carried out. It is very important that air should be excluded from the cavity. If blood or foreign matter enter the joint, it must be thoroughly washed out. When the injury is such as to preclude the idea of healing by the first intention, we should apply emollient applications, etc., and treat it like any other lacerated wound that *must* suppurate.

If suppuration take place in a closed joint, it is better at once to make a valvular opening and let the pus out; if pus continue to form and the cartilages and bones become involved, it is better to make a free opening and keep a tent in. There is no possible good to be derived from shutting up those foul accumulations; on the contrary, remove all foul matter and dead tissues, and allow healthy inflammation and granulation to do their work of reparation. Ankylosis is almost a necessary consequence of this condition, but it is the best result we can hope for.

Where the discharge is profuse, the joint should be washed out freely with a syringe charged with simple water, the chlorides, astringents, etc., according to the indication. Many of these cases have to be met by amputation, or excision of the joint. In the milder cases, great care must be taken to avoid ankylosis, which is very liable to occur. As the inflammation subsides, passive motion, liniments, iodine, etc. will be found the best remedies.

**Primary amputation** is often called for, where the injury is extensive, and complicated by the involvement of large vessels and nerves. As a general rule, it may be assumed that gunshot wounds of large articulations of the extremities are fatal, unless amputation be resorted to promptly. Even a musket or pistol ball through the knee-joint usually results in an amputation soon or late, if not death.

### SPRAINS.

These are the result of a severe twist or strain of a joint, stretching violently, and generally lacerating more or less the ligaments. The ginglymoid joints, as the ankle and knee, are most liable to these accidents. The elbow, fingers, and toes are also liable in this way. The reasons are obvious why the ball-and-socket-joints suffer rarely from sprains.

**Symptoms.**—The pain is very sudden and acute, with nausea, faintness, and inability to move the joint. Inflammation of high grade rapidly ensues, with great pain, tenderness, and swelling; sometimes

there is rupture of small vessels, and extravasation of blood. The only accident with which it can be confounded is dislocation; and often much care is necessary to make the diagnosis clear.

**Treatment.**—The indications are—1st. To combat inflammation. 2d. To restore the motion of the joint. These are fulfilled by anti-phlogistics, sorbefacients, passive motion, exercise, etc.

As soon as the part has been properly examined, a bandage should be neatly applied to give support and anticipate swelling; it must be placed at rest in an easy, elevated position, and splints used when necessary. Warm fomentations will generally be found more agreeable at first than cold applications, but this is always a matter of experiment, some constitutions requiring one and some the other. The warm applications may be applied by enveloping the part in several coverings of flannel, which is kept wet with heated hop-tea, sugar-of-lead water, with laudanum added, or simple hot water. If a piece of oil-silk is placed around the flannel, the heat and moisture will be retained much longer; holding the joint in hot water, or hot salt and water, often gives great comfort. Where the inflammation runs high, leeches may be applied with great benefit.

If the warm applications are disagreeable, we may resort to the cold, as iced-water, cold lead-water, cold douche, etc.

When there are constitutional symptoms, fever, sleeplessness, etc., they must be met by appropriate remedies.

After the inflammation and pain subside, we must resort to liniments, frictions, cold douche, passive motion, etc.

It is a matter of first importance not to use the joint in the acute stage; even the weight of the body should not be borne on it. In the more chronic condition, a crutch should be resorted to, and the joint brought into play very gradually. Not only is lameness kept up for months frequently, but permanent lameness fixed on the patient by not preserving perfect rest in the beginning.

### SYNOVITIS.

This affection, which is an inflammation of the synovial membrane, may occur in any joint, but is most common in the large articulations; it is a disease of great interest from its extreme frequency; from its influence over locomotion, and endless other consequences that result from inflammatory action.

Synovitis may be caused by cold, the presence of articular bodies, mechanical violence, as sprains, blows, falls, etc. In the majority of cases, however, it arises from rheumatism, gout, eruptive fevers, mercury, scrofula, and syphilis.

**Symptoms.**—These depend much upon the manner of attack and rapidity or acuteness with which it progresses; there is usually stiffness of the joints, which is most marked in the morning, and gradually diminishes on exercise; pain and tenderness on moving the joint or pressing it; swelling and fluctuation; pale, glossy appearance of the skin; inability of maintaining the extended position, and a sense of heat within. As the symptoms progress, the local ones become more acute, and the constitution sympathizes, exhibiting all the signs of inflammatory fever. The pain becomes very severe, especially at some spot, depriving the patient of sleep and ability to make the slightest motion of the joint.

In some cases it comes on slowly and very insidiously; the first evidence being a little stiffness or weakness, with considerable enlargement from accumulated synovial fluid. As it goes on, after weeks, or even months, the symptoms become aggravated, the joint is much distended and weak, and the limb is wasted.

In **rheumatic synovitis**, the symptoms are acute and well marked usually from the commencement. After fatigue and exposure to cold, or from some other cause, the patient may be suddenly attacked; he goes to bed at night well, and by the morning has one or more joints affected, exhibiting redness, swelling, heat, severe pain, inability to move, and with all, decided fever. The joints most likely to suffer from rheumatic synovitis are the knee, ankle, wrist, and elbow; the hip and shoulder rarely. Other forms of rheumatism may be confined to the fibrous tissues outside of the joint, while this attacks principally the lining membrane, and exhibits all the signs of synovitis before described, as effusion into the joint, etc.

The **syphilitic** form of this affection is one of the results of tertiary syphilis, and appears in those usually who have been broken down by the combined influence of syphilis and mercury. The history of these cases will generally determine the diagnosis. The **strumous** or **scrofulous** form of synovitis will be treated of elsewhere.

**Morbid Anatomy.**—The appearances presented on dissection vary greatly in different cases, according to the degree of acuteness, cause, etc. In ordinary cases of simple inflammation there is increased vascularity in the early stages, some opacity of the affected membrane, and increase of secretion. There is also some effusion of lymph, with slight adhesions, perhaps, and floating flocculi; in the acuter cases, and a little later, the vascularity is more marked; the effusion of lymph more copious, and the synovial secretion increased

and of a dirty, viscid character. The next step is suppuration and ulceration, with all its sequelæ.

**Suppuration**, as a consequence of ordinary synovitis, is unusual; it rarely occurs in the arthritic form, occasionally in the syphilitic, but very often in the strumous form.

Synovitis is always a grave affection, and there is a great resemblance between these inflammations and those of serous membranes.

**Treatment.**—In its simple forms, synovitis must be treated on the general principles of inflammation; and in the specific forms of scrofula, syphilis, etc., it should be modified accordingly.

**Position and absolute rest** of the joint are, of all things, the most important. If necessary, splints must be applied in young subjects who cannot be controlled without them.

### DROPSY OF JOINTS.

By this term is meant a chronic accumulation of fluid in a joint, preceded or accompanied by little or no inflammation. It is most frequent in the ginglymoid joints, and particularly the knee.

The **causes** may be any of those assigned for synovitis, and it is frequently inexplicable; rheumatism is the most common cause; gout and syphilis are occasional causes.

**Symptoms.**—These are generally well marked. The joint is enlarged, rounded, soft, and fluctuating, and with little or no pain except from fatigue; there is no discoloration. The progress of the disease is very chronic, the accumulation of fluid being usually gradual, but sometimes a joint may be much distended in two or three weeks. Its march is more rapid in gouty and rheumatic subjects, and after exanthematous fevers. From the symptoms and history of the case, the diagnosis is readily made out; but if difficulty should occur, the exploring needle will settle the matter.

#### **Morbid Anatomy.**

#### **Prognosis.**

**Treatment.**—Dropsy here, like elsewhere, is a **symptom**, and not the disease; the cause must be sought and removed. When the disease is purely local, as from mechanical injury, sprain, etc., rest, embrocations, blisters, etc., will generally relieve it. **Absolute rest** is indispensable in the treatment, and a well-applied bandage is important to support the parts and promote absorption.

In obstinate cases which resist all other remedies, it may become necessary to puncture the joint and allow the fluid to escape. The joint in this relaxed and torpid condition is in a very different state



from a healthy joint, and inflames much less readily. There would be great danger of violent inflammation from puncturing a healthy joint; whereas there is little from puncturing a dropsical one. The best way of puncturing, or rather of evacuating the fluid, is to insert a small trocar through the skin, then carry it for an inch beneath it before puncturing the synovial sac, so as to make a valvular opening, to prevent the air from entering; the sac is then pressed steadily to evacuate the fluid, and when the stream is about ceasing, the trocar should be withdrawn; in this way the entrance of air may be guarded against. An ounce or two of fluid left in the joint will soon be absorbed; a bandage and compress should then be well applied. In extremely chronic and obstinate cases, injections of iodine and other articles have been recommended; the injection is performed in the same way and upon the same principles as in hydrocele. I have done this several times in old cases with good effect, and without any untoward symptom.

#### MOVABLE BODIES WITHIN JOINTS.

There are certain morbid formations met occasionally within joints which interfere with their functions and often give rise not only to inconvenience, but to great pain.

What are termed **inter-articular cartilages**, or osseous concretions, are seen in different joints, but particularly in the knee, elbow, wrist, and jaw, the first being their favorite seat.

The size, number, form, color, and consistence of these bodies present much diversity. In the knee, where they attain their largest size, they sometimes equal in bulk the patella or a pullet's egg, though commonly much smaller; their number is generally in inverse ratio to their volume. When large, they may be solitary; when small, the number may reach ten or twenty; as many as sixty have been found in one case. They are mostly of a whitish, grayish, or pale-straw color; while their consistence ranges from that of fibro-cartilage to bone. Their shape also differs; they are generally more or less ovoid or lenticular, and more or less flattened by pressure; sometimes there are several united together by fibrous attachments; they are mainly smooth, but sometimes more or less rough, and of a spongy or honey-comb appearance.

**Structure.**—In their earlier stages, these bodies are usually fibro-cartilaginous, but with time assume the character of cartilage, or even bone. Their mode of development has excited much discussion, and is yet unsettled. They are doubtless the result of plastic effusion,

resulting from inflammatory action. The fact that they undergo transformations, even after they have lost their attachments, shows that they have a circulation and vitality. They are originally attached to the articular surface, from which they are developed, and we know not how and when they become detached.

**Symptoms.**—These are sometimes so well marked as to leave no room for doubt, particularly when they occur in the knee. There are other cases in which a satisfactory diagnosis is impossible. As a general rule, where the body is large, it gives little pain; whereas, if it be small, and capable of slipping about between the articular surfaces, it may cause severe pain, lameness, and inflammation. The patient, in walking, is sometimes seized with pain, so sudden and violent as to compel him to sit down, to prevent falling. Even at night, while moving the limb in turning over, this body may be displaced, and cause an attack.

When the foreign body gets in the habit of slipping about, it is certain to produce pain, more or less irritation or chronic inflammation, with enlargement of the joint and thickening of all the tissues around, together with an increase of the synovial fluid. The surgeon can, however, by careful manipulation, detect the offending body. In the knee, it generally forms a marked projection on the side of the patella, more frequently on the external than the internal, its outline being distinguishable both by sight and touch. Sometimes it retreats to a part of the joint where it gives no inconvenience, and the patient supposes it has disappeared entirely; sooner or later it comes from its hiding-place, and reproduces its characteristic symptoms. After a time, the symptoms all become aggravated, and locomotion is put an end to.

**Diagnosis.**—The most important diagnostic signs are: the suddenness with which the joint is deprived of its use, the severity of the pain, the ability of the surgeon to see, feel, and push about the concretion, and the facility with which the patient can usually relieve himself by his own efforts. The complaint is not dangerous, but gives much trouble, and the only relief is an operation, which is not free from danger, and must be conducted with great prudence.

**Treatment.**—Where the foreign body gives little discomfort, it is best to interfere as little as possible with it—a laced cap, to prevent it from slipping about, and to support the joint, is all that should be attempted. Such cases, however, are exceptions, and more decided treatment is generally demanded.

The knife is the only reliable remedy, and this is not free from danger, particularly when not used with skill. The great point is to

penetrate the joint **subcutaneously**, and extract the body through a valvular opening, so as not to allow the air to enter the articulation. When the operation is performed in this way, it is usually safe and successful. The patient should be prepared for the operation by rest, diet, etc.

In the operation on the knee, which may be applied to other joints, the limb is extended on a table; the foreign body is brought to the upper and outer part of the patella, where it is held by an assistant, while the surgeon introduces a long, narrow bistoury, from above downward, into the synovial pouch, which is then freely divided, so as to permit the concretion to be pushed through the opening into the subcutaneous cellular tissue, entirely beyond the serous lining; the puncture is covered with collodion, and a compress gently bound upon the knee, immediately over the upper edge of the concretion, the object being to promote speedy union of the edges of the articular wound. The limb is kept quiet, and cold-water dressings applied. When the inner wound is healed, the extraneous substance may be removed by a simple incision; or, if it is in a position to give no inconvenience, may be allowed to remain; being outside the joint, it forms attachments, remains stationary, and is harmless usually.

**Chalk-stones** frequently form in the joints of gouty persons. They are composed of urate of soda, phosphate and carbonate of lime. They vary much in size, shape, and consistence, and may attack one or many joints.

The only treatment for these is the constitutional treatment for gout—colchicum, aconite, alkalies, purging, etc.

**Fibrous Tumors** are sometimes formed on the synovial membranes. They occur most often in the knee, and vary in size from a pea to an almond, or even larger.

The term **fimbriated** has been applied to a peculiar growth which forms on the surface of the synovial membrane. It consists of innumerable little bodies, of all sizes, from a millet-seed to a pea; of a pale-yellowish or whitish color, and bearing a very close resemblance to the epiploic appendages of the large intestine. They are smooth, and cover the free surface of the membrane all over, being connected to it either by a broad base, or, more frequently, a narrow pedicle. It is hard to make a diagnosis, and treatment is of little avail.

## TUBERCULOSIS OF JOINTS.

Scrofulous affections of the joints are common, and may commence in any of the tissues in or around them. They are almost peculiar to children under ten years old, and are indications of strumous diathesis; the march is chronic, and soon or late involves all the tissues around. There are always other signs present of involvement of the constitution.

The disease may select any joint for its ravages; but we shall take the hip-joint as a fair type of all the class. From the importance of this joint, its deep seat, and magnitude, the affection here is one of great interest, and the diagnosis, in the early stage, is often very difficult.

**Coxalgia** is the term which has been applied to strumous disease of this joint, and, as stated of these affections of joints generally, is most common in early life, particularly under ten years, and is rare after the age of twenty.

I am, however, myself satisfied that many of the diseases of the hip which are set down to scrofula have no connection with it, but are the result of mechanical injury, from falls, leaping, etc. It is, as stated by authors generally, most common in boys, the class most exposed to injuries, and it is not uncommon to see coxalgia, where in the beginning there is no evidence of scrofulous diathesis, or of derangement of health in any way. There is no doubt that injuries may act as exciting causes where there is a predisposition, and develop disease that otherwise would have remained dormant—cold, damp, badly-ventilated apartments, bad diet, mercury; in short, all those causes which have a tendency to debilitate or to derange the general health may act as causes for the development of these affections of the joints, whether scrofulous or not.

**Symptoms.**—These are very obscure in the early stage, and the disease, in its formation, is often mistaken for others. The first symptom usually is a sense of fatigue or weariness in the limb, with a dragging motion, **pain in the knee**, and liability to trip in walking. The symptoms may vary little for several weeks, or even months; after an indefinite time, however, they are aggravated, the lameness is more marked, and the sleep is disturbed by twitching in the extremity. It is a very remarkable fact that the pain, in the early stage, is almost always referred to the knee, and particularly its inner side, although there is no great uniformity in this. It is always increased by exercise, and is usually worse at night and in damp weather. On examining the knee, there is no tenderness or mark of inflammation, free

handling and motion being borne with impunity. The pain is often of neuralgic character, being very irregular or intermittent.

The pain soon diverges from this point, and is felt in the leg and thigh, without any fixed habitation. No satisfactory explanation has been given of this pain in the knee.

After a time, which varies according to the rapidity of progress, the principal pain is transferred to the hip and its vicinity, the point or points here not being constant. Pressure and percussion, as well as rude motions or twisting, increase the pain.

The next phase shows a marked aggravation of symptoms. There is great increase of the pain in hip and knee, flattening of the buttock, effacement of the gluteo-femoral crease, and apparent elongation of the limb, with twitching and wasting of the muscles; the pain and restlessness at night become very distressing; the general health, digestion, etc. become much impaired; high irritative fever is developed, and the patient rapidly emaciates.

The local symptoms, so obscure in the early stage, now become well developed: the buttock is greatly flattened—it is much broader as well as larger than the sound side; the gluteal muscles are soft and flabby, and skin loose; the gluteal crease is entirely effaced; the muscles of the thigh and leg are much wasted.

A prominent symptom now is elongation of the limb, and is almost pathognomonic; it varies from half to an inch and a half, and is observable standing or lying. The explanation of this elongation is not easy, but is supposed by some to depend on excess of synovial fluid; but the most probable cause is a difference in the level of the hips, owing to the active use of the muscles on the sound side, while on the other they are relaxed and enfeebled; there is, therefore, *no real elongation* of the limb—it is only *apparent*.

Finally, in this stage there is generally a marked depression in the lumbar region, with a slight inclination of this part of the spine toward the sound side, and an unusual prominence of the abdomen.

In the last stage of this affection the symptoms reach a point which puts at rest all doubts, if any should still linger, as to its character. Matter is now formed, and its presence is indicated by increase of pain, throbbing and tension, increased swelling of the gluteal region, which is most prominent over the articulation; by œdema and enlargement of the superficial veins; the joint cannot bear the slightest pressure or motion; the constitution suffers, and there are rigors, high fever, and copious sweats. In some rare cases, the abscess forms in a quiet way, with little general disturbance.

Fluctuation becomes distinct as the matter approaches the surface.

It may point in various directions about the gluteal region, near the joint, or at some distance off—sometimes in the groin or low down on the thigh; there may be one or a dozen openings, some of which are long and tortuous. In rare cases, the matter may work through the acetabulum and discharge into the pelvis, and escape through or beside the rectum or vagina. The pus discharged is of that peculiar, unhealthy character usually which belongs to scrofula, and often has mixed with it portions of the broken-down tissues, as cartilages, bone, etc. The pus is fetid, as is the case in bone affections generally in the commencement.

The suppuration is sometimes profuse and exceedingly debilitating, at others sparing, and it varies greatly, from time to time, in the same case, continuing for months or years. When it is very chronic, the evidence is strong that there is caries or necrosis of the bone present. In many cases the patient is worn out by hectic, the constant drain, and suffering.

Suppuration does not occur, or at least only to a very limited extent, in some cases, which leaves behind great deformity.

The abscess, there is reason to believe, usually commences *in* the joint, though it may be attacked secondarily.

After suppuration has been fully established in the joint, and the matter discharged, very striking and characteristic changes in the parts follow. The limb now really becomes shorter, is much wasted and disfigured, the heel being considerably elevated, and the toes only touching the floor when the patient stands. The degree of shortening varies to the extent of several inches, but is often more apparent than real, from distortion of the pelvis. The position of the foot is variable, sometimes looking forward, most commonly outward or inward, and by far the most frequent position is the latter. All this depends upon the extent and direction of the ravages committed around the joint. When the acetabulum is destroyed, and the head and neck of the femur is entire, the foot turns in, as in dislocation upward; and when the head and neck are destroyed, the foot turns out, as in fracture of the neck. The thigh is generally more or less flexed on the pelvis, and is directed inward toward the other limb; in rare cases it stands out in the opposite direction.

The thigh is always in a very rigid state, owing to contraction of the muscles and thickening of the surrounding tissues. The thigh cannot be abducted or carried backward, on account of the extreme tension of the muscles. The leg is usually flexed on the thigh, from contraction of the ham-string muscles.

The position of the trochantèr is directly over the acetabulum, or

near it, and the head and neck are usually removed by the disease. Luxation of the bone, however, is extremely rare, the shortening being attributable to the destruction of the head of the neck alone.

**Diagnosis.**

**Morbid anatomy.**

**Prognosis.**

**Treatment.**—This depends much upon the stage and the condition of the constitution. In those cases of scrofulous character, little is to be expected from local remedies, and our attention, therefore, must be directed to the constitutional symptoms.

In every stage, and under all circumstances, **absolute and unconditional rest** must be insisted on; without this, all treatment is useless. The recumbent position must be continued for months, as one minute's motion of the joint may undo all the good done by protracted rest.

In the early inflammatory stage, leeches, cups, blisters, etc. must be employed; poultices often afford much relief; occasional purging is also well; anodynes are often indispensable.

In delicate ænemic frames, a tonic course must be adopted.

Most surgeons insist not only on the recumbent position, but on splints so contrived as to render the hip-joint immovable. As for issues, repeated blisters, etc. in the latter stages, they are to my mind worse than useless.

After suppuration is fairly established, and destructive ulceration is going on, it becomes a question whether free incision should not be made, the broken-down fragments of bone, cartilage, etc. removed, and a better chance allowed the part for healthy granulations. I am a decided advocate for this practice.

## ANCHYLOSIS.

By this term is meant a stiff or motionless condition of a joint, which is usually the result of inflammatory disease. It is characterized by the terms complete or incomplete, according to the presence or absence of slight motion. There is also **false ankylosis**, when the motion is destroyed, not by disease of the joint itself, but the tissues around, as in extensive burns, etc., involving the skin and cellular tissue.

All the causes which have been spoken of, productive of inflammation, and many others, as fractures, etc., may lead to ankylosis. Disease alone of a joint may produce it. In intra-articular ankylosis, the first step is effusion of lymph, which becomes changed, first into

fibrous or cellulo-fibrous tissue, then into cartilage, and finally into bone, which unites the ends of the bones of the articulation so firmly as to put an end to all motion. When a joint is rendered motionless by the internal deposition of plastic matter, ossification almost invariably follows, soon or late. The adhesions alluded to vary greatly in extent—in some instances constituting only a few detached bands, the remainder of the synovial membrane being sound; in such cases the adhesions may be broken up, and the joint regain its function. These bands or adhesions may be extended indefinitely to many or all parts of the joint, and in the worst cases ossification follows.

**Treatment.**—The use of sorbefacients, frictions, and passive motion is generally sufficient to relieve the milder cases.

Where these fibrous bands exist, all inflammation has disappeared, and slight mobility still remains in a joint, we may often succeed by placing the patient under chloroform, and breaking up the adhesions by forcible flexion and extension of the joint. A certain amount of inflammatory action usually results from such efforts, and it must be promptly met by antiphlogistics.

In some cases they are best managed by mechanical apparatus, which makes gradual extension of the joint.

When the force used is too great the bones are sometimes fractured, and under any circumstances, after these forcible attempts, violent and even fatal symptoms may follow. When we have reason to expect ankylosis, we should place the limb in the position which would be most useful; the arm should be flexed and the leg straight for obvious reasons.

In cases of firm, bony ankylosis, when the limb has been flexed in a position to be useless, operations for relief have been performed by dividing or removing a portion of bone, and then placing the limb in proper position, and retaining it there till the parts have healed.

## DISLOCATIONS.

A dislocation is the displacement of one articular surface from another. It is usually the result of external violence, and is accompanied by laceration of the connecting ligaments.

**Importance** of a thorough knowledge of the subject to the young surgeon.

As every joint is composed of at least two bones, the question arises, when the accident occurs, **which is the dislocated bone?** Custom has established among surgeons, that the bone nearest the body



is to be regarded as the fixed bone, and the one farthest off as the luxated one.

They are divided into **simple** and **complicated** or **compound**, **complete** and **incomplete**, **primitive** and **consecutive**, **recent** and **old**, and **congenital**.

Definitions of each.

The ball and socket joints, or those which have most freedom of motion, are most liable to luxations, as the shoulder and hip.

**Causes of Dislocations.**—Violence; muscular contraction.

Dislocations may occur at any period of life, but are more frequent in the middle periods and in old persons, than in childhood and youth.

There are many symptoms common to nearly all dislocations, as loss of function, deformity, change in the length and axis of the limb, numbness, swelling, pain, etc.; but these are best considered in connection with particular dislocations.

**Morbid Anatomy.**—The head of the bone, on dissection after recent injuries, will be found displaced to a greater or less extent, and in very different directions. The ligaments are more or less lacerated; the displaced head rests upon some of the tissues on the outside of the joint, which is generally occupied by blood, fluid or coagulated. The muscles are stretched, and sometimes lacerated. The nerves also are sometimes displaced or pressed upon; so, also, with the blood-vessels. If examined some days after the accident, all the marks of inflammation, in some stage, will be found.

**Treatment.**—The indications in simple luxation, are: 1st. Reduction of the bone. 2d. Absolute rest till the ligaments have time to unite. 3d. To combat inflammation. 4th. To restore the functions.

In reducing a dislocation, we should bear in mind the forces which oppose us, viz., the firm contraction of muscles, the ligaments, and prominences of bones. Too much importance, no doubt, has been attached to the muscular resistance alone, as great difficulty often remains after the muscles are fully relaxed.

The mechanical means used, as well as the constitutional, will be explained in the treatment of individual cases.

**Complicated luxations** are those in which the displacement is accompanied by fracture, the rupture of an important nerve or blood-vessel, a violent contusion or wound extending deeply into the surrounding tissues, or even into the joint; one or several of these lesions may exist at the same time. Such injuries are most frequent in the elbow, wrist, knee, and ankle, for the reason that they are least protected and most likely to receive violence.

The symptoms of such cases are usually very obvious, and if you recollect the remarks we have already made on wounds of joints, you will readily comprehend their gravity. A complicated luxation is always a serious injury, liable to be followed by most violent symptoms, and not unfrequently death. Inflammation, erysipelas, abscesses, pyemia, etc., are frequent consequences.

**Treatment.**—The parts should be reduced and dressed, on the common plan of wounds, as soon as possible, by plasters, stitches, bandages, position, etc. All loose bone must be removed. When the end of a bone protrudes through a small wound in the skin, and cannot be reduced, the opening must be enlarged. If the end of the bone is sharp, or denuded of periosteum, it must be cut off by the saw or pliers. Chloroform is of great use in these cases.

If the luxation is complicated with fracture, it must be reduced as soon as possible, before adjusting the fracture. Splints of course should be used where applicable.

**After-treatment.**

**Amputation and resection.**

#### CHRONIC, OLD, OR NEGLECTED DISLOCATIONS.

These are very embarrassing cases, as it is not only difficult, but often impossible, to say after what lapse of time it may be prudent or safe to attempt reduction.

**Anatomical changes** which occur in these cases.

Manner of attempting reduction; preliminary steps.

Danger of rupturing arteries, nerves, etc.

#### PARTICULAR DISLOCATIONS.

**Lower Jaw.**—From the form of this joint, dislocation can only occur **forward** and **downward**, the condyle slipping into the zygomatic fossa. It usually happens on both sides in consequence of yawning, gaping, vomiting, convulsions, etc., but may occur on one side only, and from mechanical violence applied to the chin, particularly when the mouth is open.

**Symptoms.**—Mouth is wide open, and cannot be closed; the chin is advanced; the condyle is found in advance of its natural cavity, which will be found void.

The **reduction** is generally easily effected by the thumbs, covered with a thick glove, or towel, to prevent being bitten; and, with the aid of chloroform, is usually quite easy; the chin is drawn up with the fingers, while the thumb presses down.

It is easily thrown out again, and the patient should be watchful.

**Dislocation of the clavicle** is rare, compared to fracture.

The **sternal extremity** may be dislocated forward, backward, and upward; downward, impossible.

**Symptoms** of each.

The **reduction** is easily effected, but it is so difficult to maintain it in situ, that deformity is always the consequence. Firm ligamentous union, however, takes place, and the motions and strength of the arm are well preserved.

**Treatment.**—A wedge-shaped pad is placed in the axilla, a stout compress over the head of the bone; the elbow supported in a sling, and the arm well bound to the side.

The **scapulo-clavicular** extremity is firmly articulated to the inner margin of the acromion process of scapula, and can only be torn loose by a direct blow on one or the other bone, or indirectly through the arm or sternum.

This dislocation may occur in three directions: **upward**, above the acromion; **downward** and **backward**, beneath this process; and, **downward** and **forward**, under the coracoid process. The first is far the most common.

**Symptoms** are—

The **reduction** is easily accomplished, but the same difficulty in the treatment, from the extreme mobility of the parts, occurs in this as the dislocations at the inner extremity.

**Treatment** of these is by the same apparatus as that described for dislocations of the other extremity, or for fractures of the clavicle.

### Dislocations of the Spine.

**Symptoms and treatment.**

**Dislocation of Ribs.**—Extremely rare at the costo-vertebral articulation, as might be expected from the mode of attachment and protection.

Impossible to make a satisfactory **diagnosis**.

The rib is sometimes, by violent blows, knocked loose from its cartilage, or the latter from its attachment to the sternum.

The **treatment** is a simple bandage, and attention to the contusion and other symptoms.

**Dislocations** of any of the **phalanges** of the fingers, or **metacarpal bones**, may occur; but we will not detain you with these, as they rarely give much trouble, and the treatment is obvious on general principles.

**Dislocation of Wrist.**—The dislocation of this articulation is so rare, that a surgeon of no less reputation than Dupuytren denied the possibility of its occurrence. Since his day, however, it has been clearly proven that this accident does happen. The mode of articulation of the radius, with the scaphoid, semilunar, and cuneiform bones, is such, and the ligaments so strong, that the lower end of the radius gives way when violence is applied, and is fractured before dislocation can occur in most cases.

The carpal bones may be displaced from the radius and ulna backward or forward; luxation laterally cannot occur without fracture.

An ignorant surgeon may mistake these dislocations for fracture, but the injury is so well marked, that a careful common-sense examination will suffice to guard against this error. The deformity in dislocation is much greater than in fracture.

The **reduction** is easy, gentle extension and counter-extension being sufficient. A splint on the palmar surface, and bandage, with cooling lotions, and proper attention to the motion of the joint, meet the indications.

**Radio-ulnar Joints.**—The ulna may be thrown forward or backward, beyond the line of the radius. Both are very rare, except as an accompaniment to fracture of the lower extremity of the radius.

Dislocation **backward** of ulna, is usually the result of violence applied to the hand or forearm during pronation, from sudden twist or wrench. The signs are characteristic: the hand is in a fixed state of pronation, and inclined toward its inner margin; the head of ulna is directed obliquely across the radius, and forms a distinct eminence above the cuneiform bone; the lower extremity of arm looks unnaturally narrow. The reduction is made by flexing the forearm at right angles with the elbow, and then making firm extension and rotating it outward.

The symptoms of dislocation **forward** are the reverse of the one just described. The reduction is effected in the same way.

A splint and bandage are required, with great care, in combating inflammation.

**Dislocation of the Superior Radio-ulnar Joint** may occur in three directions, the head of the radius being thrown from the sigmoid cavity of the ulna forward, backward, or outward, the frequency of each being in the above order.

The most common causes of dislocation **forward**, are falls on the palm of the hand.

The **symptoms** are well marked. There is a vacuity at the natural position of the head of the radius, which can be felt in its new position in front of the elbow, rolling about under the finger, upon rotating the hand. The forearm, slightly flexed, is in a state midway between pronation and supination, and all attempts to straighten or bend it are unavailing. When an effort is made to flex the arm suddenly, the head of the radius is felt to strike against the humerus, which is very characteristic of the nature of the accident.

The **reduction** is easily accomplished. An assistant seizes the arm at its middle, to make counter-extension; another seizes the hand on which extension is made in the semiflexed direction, to relax the biceps muscle. The extension is then made, and the head of the bone is pushed in place, while supination is made; the head thus easily slips in place.

The dislocation **backward** and **outward** is uncommon, but easily detected, if you bear in mind the natural position of the bones. The head of the bone is found to be in its unnatural position, and the **reduction** is then effected by extension, and pressing the bone in place with the fingers.

After once occurring, these accidents are exceedingly liable to take place again on slight provocation; it is, therefore, important to bandage the arm well, apply compresses, so as to keep the bone in place, and to maintain the parts at rest till time has been given for union of the ligaments—at least two weeks.

**Dislocations of Elbow.**—These are among the most important subjects that can command the attention of the surgeon—from their frequency, their complications, difficulty of diagnosis, and danger of permanent deformity and loss of motion. They are generally worse understood and treated than any luxations in the whole body, and this should satisfy you of the importance of understanding thoroughly the **anatomy** of this joint.

The dislocation of the bones of the forearm at the elbow, **upward** and **backward**, in contact with the posterior surface of the humerus, is the most common. Displacement of these bones **forward** is very rare, and cannot well take place without fracture of the olecranon process.

**Lateral** displacement of these bones is also very rare, and always *incomplete*, from the great breadth of the articulation, and strength of the ligaments and muscles. We have already spoken of the head of the radius alone. The ulna may also be dislocated alone, upward and backward.

Dislocation of both bones **backward** is usually the result of a fall, the patient receiving his weight on the extended hand and arm. The ligaments are thus ruptured, and the radius and ulna driven backward and upward behind the humerus.

The **symptoms** are well marked, when not complicated with fracture. The limb is semiflexed, and there is great deformity at the elbow. There is a great projection behind formed by the olecranon, and in front a large tumor, formed by the condyles of the humerus. The forearm is fixed in a semiflexed position, and any attempt to move it is painful and unsuccessful. The fingers are flexed, and the distance between the elbow and wrist diminished at least an inch *in front*. The muscles in front of the joint, biceps, and brachial are stretched over the condyles, while the triceps behind is thrown back, and stands out boldly from the humerus, forming one of the most conspicuous signs of the accident.

In rare cases, the arm is straight instead of semiflexed, and more movable.

Where there is much swelling, before the examination, or fracture, the **diagnosis** is sometimes far from being easy. Where there is fracture of the humerus just above the condyles, the contour presented greatly resemble in the two injuries. In dislocation, however, the parts are *fixed*, while in this fracture they are movable; and the deformity in fracture is easily removed by extension, though it returns when it is withheld. In dislocation, too, there is actual shortening of the forearm, while in fracture there is none. Crepitation is always obvious, too, in fracture. It cannot be confounded with fracture of the olecranon or neck of the radius.

The **reduction** is very easy at first, but difficult, or even impossible, after the lapse of time—even after one or two weeks it is sometimes impossible. The reduction may be well done by placing the heel in the bend of the arm and making traction on the hand, the leg passing across the chest; the arm is gradually flexed as traction is made. If necessary, the surgeon may increase the extending force, by a towel bound to the wrist and passed over the back of his neck.

The reduction may be well done by letting the patient sit in a chair, and bending the arm across the knee; or the arm may be bent around a bedpost, the principle in each being the same.

Chloroform or ether should be used, and, in cases of long standing, pulleys may be necessary.

It has been proposed, even in bad cases, to divide the existing tendons, but this is a dangerous procedure, from the complicated anatomy.

The after-treatment is of great importance; the arm should be carefully bandaged and supported by one or more angular splints. The wire-splint is best, because it is light, cool, and allows the free use of cold water. To prevent ankylosis, it is very important to resort to passive motion gently after the inflammation subsides.

**Dislocation of the Radius and Ulna forward** is extremely rare, particularly without fracture of the olecranon, but instances do occur.

The **signs** are characteristic. The forearm is shortened or lengthened, according as the olecranon is thrown entirely above the articulating surface of the humerus or not. The forearm is slightly flexed, but may be moved without force, even **backward**. The end of the humerus is felt behind, and a depression where the olecranon should be. The reduction is easily made by extension and counter-extension, with well-directed pressure on the ends of the displaced bones.

**Treatment** the same as in the last-named injury.

The dislocations **outward** and **inward**, which are always partial, are easily detected and reduced.

**Dislocation of the Ulna alone backward** is rare, and cannot well occur without fracture of the coronoid process. The **signs**, **reduction**, and **treatment** are all plain.

There is a dislocation described in which the two bones are thrown in different directions—the ulna backward and radius forward.

**Compound Dislocations of the Elbow** are extremely grave injuries, always giving great trouble, and generally demanding amputation.

**Dislocations of the Shoulder.**—These are the most common of all dislocations, and, therefore, important to know well.

They are very rare under the age of fifteen, and increase with age up to about sixty, after which they become less frequent.

There has been needless ingenuity displayed on the *nomenclature* of these injuries; but there are in reality but three displacements worthy of remembrance, the others being mere modifications of these. These are the **axillary**, **thoracic**, and **scapular**. In the first, the head of the bone is thrown down into the axilla, below the glenoid cavity; the second, below the clavicle, on the ribs; and in the third, the head of the humerus rests on the scapula, below its spine. To these may be added, as varieties of the first two luxations, those cases in which the head of the bone has been found in the subscapular fossa

and upon the anterior part of the neck of the scapula, below the coracoid process.

Dislocation into the **axilla** is far the most common, and may be produced by violence, applied in various ways, direct or indirect, and occasionally by simple muscular contraction.

In this injury the head of the bone is found in the axilla, just below the glenoid cavity, lying on the inferior border of the scapula, between the subscapular muscle and long head of the triceps. The axillary nerves and vessels are somewhat pressed upon, the capsular ligament freely lacerated below, and the articular muscles usually more or less lacerated.

**Symptoms.**—Great prominence of acromion, which is sharp, and distinctly felt, with a marked depression beneath; the shoulder is flattened, and the head of the bone is prominent in the axilla—easily felt, particularly on rotating the arm; the elbow stands out from the side, and the arm is lengthened; the fingers are numbed, and the arm is rigidly fixed in its unnatural position, not admitting of much motion in any direction, particularly inward, or outward, or upward. If the patient can carry his arm across the chest and place the fingers of the injured arm on the opposite shoulder, *there can be no dislocation*. This is important to remember.

**Reduction.**—This is, in recent cases, generally easily effected, by placing the heel upon a pad in the axilla, and making extension from the forearm. If necessary, the power may be increased by passing a long towel or piece of domestic over the neck of the operator, and binding the ends either to the arm above the elbow or to the wrist. After making firm extension for some minutes, and finding the muscles to yield, the elbow should be carried toward the chest, in order to raise the head of the humerus from its bed. The patient should, in this method, be laid on his back on a sofa, or along the edge of a bed, with one pillow under the head.

Where not much resistance is anticipated, reduction may be effected in the sitting posture by using the knee as a fulcrum, the foot being placed on the chair, and the humerus made to act as a lever over the knee in the axilla.

Mr. White, of Manchester, laid the patient on his back, put one hand upon the shoulder, to fix the scapula firmly by pressing it down, while he raised the arm directly upward and outward. This plan has been revived by Malgaigne. The surgeon makes extension while he raises the arm.

In some old cases, where protracted and powerful extension is required, the pulleys may be advantageously employed, but it should



be done with great caution, for fear of rupturing important parts, as has been too often done.

The **Thoracic, or Subclavicular Dislocation**, is comparatively rare. The bone, most commonly by direct violence, is thrown to the sternal side of the coracoid process, just below the clavicle, its head resting against the second and third ribs, beneath the pectoral muscles. There is considerable laceration of the capsule, and usually more or less injury to the subscapular, infra-spinatus, and teres minor muscles, all of which are attached around the head of the humerus.

The **symptoms** are usually well marked. They are much the same as the dislocation into the axilla, except that the head of the bone is distinctly felt beneath the pectoral muscles, just below the clavicle, and its presence is made more distinct by communicating motion to it through the arm; and it differs also in the position of the arm, the elbow being directed **backward** as well as outward. The limb is **shortened** from half an inch to an inch.

The **reduction** is effected as in the last case, except that the extending force should be somewhat backward in the direction of the bone.

**Dislocation on the scapula, backward**, is very rare. The head of the bone is thrown on the dorsum of the scapula, below its spine.

**Symptoms.**—Shoulder flattened; acromium prominent; arm **shortened** one or two inches; forearm strongly rotated inward, and bent obliquely across the chest; head of bone absent from axilla, and plainly felt on scapula; supination of limb impossible, and all motions painful and difficult.

**Reduction** is effected as in the above cases, by the heel in the axilla, bearing in mind to make extension in the direction of the bone.

The **diagnosis** of luxations of the shoulder is usually easy, but not in all cases. Simple contusion, with considerable swelling, may embarrass the surgeon. Under such circumstances, the presence of the bone in the glenoid cavity, the rotundity of the shoulder, and the arm retaining its proper length, will be sufficient.

Perplexity may arise where there is fracture of the acromion, the neck of scapula, or neck of humerus, and the surgeon cannot be too cautious in giving his opinion.

There are three symptoms, however, if borne in mind, will always protect against mistake in all these cases, viz., unnatural **mobility** of the parts, **crepitation** and facility of reduction, followed by *imme-*

*diate recurrence of the symptoms as soon as extension is withdrawn.*

In dislocation the above signs are all absent; the bone is difficult to reduce, and when reduced, remains in its normal position.

In fracture of the acromion, the arm sinks, the shoulder looks flattened, but the deformity is at once removed by simply pushing the humerus up by placing the hand under the elbow.

When the neck of the scapula is fractured, which is very rare, the acromion retains its position, but is too prominent; the arm is elongated, and crepitation is easily produced by raising the elbow, which restores also the form of the joint.

In fracture of neck of the humerus, the head is found in its proper position, while the rough, angular end of the shaft is drawn into the axilla by the pectoral and latissimus dorsi muscles. Crepitation is felt, and the acromion is in its true position; the shoulder is not flattened, and the arm is shortened.

#### **Double dislocation.**

**After-treatment.**—Little motion allowed for a month.

**Liability to recurrence.**

**Chronic Dislocations.**—How long after a dislocation of the humerus may reduction be attempted? This is a difficult question, and no absolute rule can be laid down.

**Dislocations of the Foot.**—Various dislocations of the toes, metatarsal, and tarsal bones, may occur; they are rare without complications, and must be treated on the plain general principles already laid down.

**Dislocations of Ankle.**—The injuries of this joint are important from their frequency, their consequences, and difficulty of diagnosis; displacement rarely takes place in any direction without fracture, so powerful are the attachments which bind the bones together.

The ankle-joint may be dislocated in four directions, the foot being thrown **forward, backward, inward, or outward.**

The symptoms of the dislocations forward and backward are so well marked as not to require description, and by flexing the leg to relax the gastrocnemii muscles, the reduction is generally made without difficulty; in extreme cases it may be necessary to divide the tendo-achillis, where the injury is of some standing.

Luxation **inward** is not so common as that outward, and is almost always accompanied by fracture of the internal malleolus.

Luxation **outward** is the most frequent, being produced by a sud-

den twist or other violence. The lower end of the fibula is always broken in this injury, and not unfrequently the inner malleolus is fractured at the same time. The symptoms of this injury are unmistakable; the internal malleolus is thrown inward, forming a remarkable projection under the integuments; the foot has a twisted appearance, and is easily rotated on its axis, its inner border resting on the ground; a considerable depression exists on the outward surface of the leg, a short distance above the joint, corresponding with the point of fracture of the fibula, and the astragalus can be felt below the external malleolus.

If proper regard be paid to the structure of the joint, all these injuries may be readily detected; the reduction is generally easy, and they are to be treated by bandages, splints, antiphlogistics, etc. Under the best treatment, stiffness or deformity may ensue, and the recovery is always very slow, requiring often many months. The treatment must be prompt and active.

**Compound dislocations of the ankle** are exceedingly grave injuries, often requiring amputation.

All these injuries will be fully explained in my lectures.

**Dislocation of the Patella.**—This can only occur outward and inward, and may be complete or incomplete. Another luxation has been noticed, viz., the vertical, in which it is placed edgewise; they are all very uncommon. The one outward is most common.

The **signs** of these dislocations are so obvious as to need no description, and the reduction of the first two is easy, but sometimes very difficult in the third. Cases do occur also, in which great difficulty attends the reduction of the first two, particularly when not attended to immediately.

**Dislocations of the Knee.**—Owing to the breadth of the articulating surfaces and the strength of the ligaments, these accidents are rare. Luxation of the tibia may take place in four directions, **forward, backward, inward, and outward.** The last two are most common and always incomplete. Those forward and backward are also most commonly incomplete, but not always.

The extremities of the bones are so broad, and the signs of all these dislocations so evident, that it is useless to waste time in describing them; the sight and touch reveal their true nature at once. There is always considerable injury done to the soft parts, and the after consequences are likely to be serious; under any circumstances there must be very extensive laceration of ligaments and

tendons, followed by high inflammation, which has to be combated by the rules laid down in injuries of the joints. Where the dislocation is compound, amputation is nearly always demanded.

**Dislocation of the Semilunar Cartilages.**—These bodies are subject to a displacement known under the name of **subluxation**, and is most commonly seen in those of debilitated, relaxed system, and particularly after chronic affections of the joint. A sudden twist, or awkward trip, are the most common causes. The lesion consists in the partial removal of the semilunar cartilages from their natural position, allowing them to become wedged in between the tibia and femur, in consequence of the relaxed condition of the ligamentous connections. Occasionally, where the violence is great, some of these connections are torn loose.

The **symptoms** are usually well marked. The patient is at once conscious that some injury has occurred within the joint, and feels faint; the pain is excruciating; the limb cannot be extended, and he is compelled to sit or lie down. If the joint is examined immediately, no change is detected, and the surgeon may conclude it is only a strain; inflammation soon occurs, with swelling, and effusion into the joint. The pain and shock are due to the change of position of the cartilages which are pressed upon, and the strain on the ligaments. After occurring once, it is very liable to reappear from slight provocation, and the patient should always be on his guard.

The **reduction** is very painful, and should not be attempted without chloroform. The patient should be in the recumbent posture, and the thigh well flexed on the pelvis. The surgeon, placing his arm behind the bend of the knee and grasping the limb just above the ankle, bends the knee suddenly and forcibly, and then rapidly extends it, at the same time giving a motion of rotation to the leg. The limb should be bandaged and kept quiet for some days, and cold lotions applied, after which a laced cap should be worn.

**Dislocations of the Hip-Joint.**—These are much less frequent than similar injuries of the shoulder; the reasons for which are obvious. The socket of the bone is deep, the attachments and coverings strong, and violence is less frequently communicated to the thigh-bone than the humerus.

**Age** exerts a very marked influence over these accidents. They are rare in children, in whom the tissues are all more elastic than in adults, and in whom, from imperfect ossification, the epiphyses are more likely to give way before dislocation would occur. In old age,

too, these dislocations are rare, as the violence generally results in fracture from the brittleness of the bones. After the age of fifty-five, fracture of the neck or upper part of the shaft of the femur is more likely to occur than luxation. It is most common between twenty-five and forty-five; cases have occurred as early as from three to five years. The head of the femur may be displaced in four directions: **upward** on the dorsum of the ilium; **backward** into the sciatic notch; **downward** into the thyroid foramen; and **forward** on the pubes; and in frequency they occur in the above order. There are some other anomalous dislocations which will be noticed, but they are extremely rare.

#### Causes.

In all these dislocations there is great injury done to the ligaments of the joint and the rotator muscles. There is also frequently much contusion around, effusion of blood, swelling, and inflammation. In the dislocation upward and backward on the dorsum of the ilium, the head of the femur rests in the fossa and lies on the gluteus minimus muscle; in some cases it is thrown more forward.

The **symptoms** are well marked. The hip is deformed, being more prominent than naturally; the trochanter major is carried upward and inward, nearer to the superior spinous process of the ilium. The head of the bone can be felt in thin subjects in its new position, and may be made to rotate under the finger. The limb is shortened from an inch and a half to two and a half inches; the foot is strongly inclined inward, the big toe pointing toward the opposite instep; the knee is a little above and in advance of the sound one when the patient stands, and resists any attempt to turn it out; the thigh is slightly flexed on the pelvis, and may be carried across the sound one; the leg is flexed on the thigh and the heel elevated from the floor. The limb is firmly fixed in its position, and cannot be restored to its proper length without reducing the luxation, and can only be moved a little inward. In the recumbent posture the position of the limb in relation to the other parts, varies little from that when standing.

The only injury with which it is likely to be confounded, is fracture of the neck of the femur within the capsular ligament; the diagnosis, however, is generally easy. In the fracture, the trochanter is drawn backward, and is less prominent than usual; the foot is everted, instead of inverted as in luxation; the limb can be readily restored to its proper length by extension, but immediately resumes its former position as soon as the extension is removed; and finally, crepitation is produced by rotation. Moreover, the limb in fracture

is susceptible of being moved about with much greater ease, though painful, than in dislocation.

**Fracture of the great trochanter**, where it is detached and drawn up by the muscles. In this case, a prominence is felt above near where the head of the bone lies in dislocation, but every other symptom of the dislocation described is wanting.

**Manner of measuring** the shortening by a tape extending from the spinous process of the ilium to the center of tuberosity of the condyle, etc. The degree of shortening varies much, from one and a half to three inches.

The **reduction** of this dislocation is generally a matter of considerable difficulty, and we are greatly indebted to Dr. Reid, of Rochester, for introducing a method much more simple than those which have been previously employed.

The patient is best lying on the floor, and should be fully under chloroform. The surgeon, then grasping the knee with one hand, and the leg just above the ankle with the other, flexes the thigh upon the pelvis, and the leg on the thigh, carrying the limb across the sound one and the knee over the abdomen as high as the umbilicus. The knee is now turned outward on a line with the injured side, a procedure which will draw the big toe from its inverted into an everted position, and of course incline the heel proportionably inward, or in the opposite direction. In the last stage, the foot is carried across the sound limb, and the knee pushed outward and downward, when the thigh being gently rotated, the head of the bone slips at once into its socket with an audible jerk, and the injured limb resumes its natural position. The whole operation may be performed in two minutes, or less.

The whole procedure is a beautiful one, and is based on a thorough knowledge of the nature of the injury, and the anatomy of the parts. The muscles which resist reduction are all relaxed in turn, and the head of the bone is made to enter the rent in the capsule through which it made its escape. Dr. Reid cannot be accorded too much praise for his discovery.

Where the head of the bone is thrown into the **sciatic notch**, it rests on the pyriformis muscle, between the sacro-sciatic ligaments and the convex surface of the iliac bone. The capsular ligament is torn, and the psoas, iliac, and obturator muscles are put on the stretch, and occasionally more or less torn.

The **symptoms** bear a close resemblance to those of the dislocation

on dorsum of ilium, just described, and some writers regard them merely as modifications of the same lesion, the bone in one case being drawn, or thrown higher than in the other. The limb is shortened much less in this than the other, being only from half an inch to an inch, and is firmly fixed; the great toe rests upon the ball of the sound one of the other foot; the knee is advanced in front of the opposite one, and turned in, but not so much as in the other luxation; the trochanter is **lower than natural**, and farther from the crest of ilium, and the head is so deep in the notch as to be rarely detected except in very thin subjects. Both thigh and leg are a little flexed.

The dislocation into the **thyroid foramen** presents very different symptoms from the last two; the head of the femur is thrown **downward** and **forward** into the foramen, resting on the external obturator muscle, the great trochanter being turned backward toward the acetabulum.

The **symptoms** are well characterized. The hip has lost its convexity, and there is a flattening where the trochanter should be, and sometimes even a depression; the trochanter is removed beyond the natural distance from the anterior spinous process of ilium. The limb is **increased in length**, from one to two inches, and **stands off** in an awkward manner from the sound one, the knees being widely separated. The trunk is bent forward by the tension of the psoas and iliac muscles, and the head of the bone is distinctly felt in the thyroid foramen in thin subjects; the knee is advanced and everted. The motions of adduction, extension, and rotation cannot be executed, but those of abduction and flexion may be by the surgeon, but not without pain.

The **diagnostic** symptoms are the widely-separated state of the knees; the elongation of the limb, which does not exist in any other luxation; the forward inclination of the body; flattened state of the nates; the excessive tension of psoas and iliac muscles; and impossibility of adducting, extending, and rotating the leg. The unnaturally low position of the trochanter is also an important sign.

The **pubic** variety of dislocation is very rare; the head of the femur is thrown on the horizontal branch of the pubis, above Poupart's ligament, and external to the femoral vessels, beneath the psoas, iliac, and rectus muscles. The limb is shortened about one inch; the foot and knee are everted, and separated from their fellows; the buttock is flattened; the trochanter lies nearer the middle line than naturally, and the head of the bone is easily felt by rotating the limb; adduction and rotation inward are impracticable.

**Reduction.**—We have already described the mode of reduction applicable to most cases of the first variety spoken of, and there are many cases recorded of late in which the same manipulations have been successfully applied to the other forms of luxation.

In the **pubic** and **thyroid** varieties, the surgeon may, in some recent cases, succeed by placing the heel in the perineum and making extension on the leg, and carrying the limb gradually across the sound one; or, to increase the force, a long, stout noose may be attached to the thigh, above the knee, and passed around the operator's neck.

In robust, stout persons, or in chronic cases, it becomes necessary to resort to pulleys when the method by manipulation fails.

**Manner of using the pulleys described** in each of the four dislocations, viz., the **iliac**, the **sciatic**, the **thyroid**, and **pubic**.

**After-treatment.**

**Chronic Dislocations.**—No definite time can be fixed for these cases. As a general rule it is not considered safe or proper to attempt reduction of these dislocations after six or eight weeks, and in many it is impossible much earlier. Where the head of the bone is lodged in the sciatic notch, or thyroid foramen, it becomes imbedded and firmly fixed in a comparatively short time, and the reduction much more difficult than in the other cases.

The symptoms forbidding the attempt are immobility of the limb; occlusion of the acetabulum by deposits; and great derangement of the general health. With regard to the condition of the acetabulum, this is difficult to ascertain, and can only be inferred from the amount of inflammation following the accident.

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## DISEASES AND INJURIES OF BONES, Etc.

The bones have an organization resembling other tissues, and are subject to inflammation and its consequences, as well as specific diseases. From the amount of earthy matter that they contain, and the comparative deficiency of vascularity and sensibility, they resist diseases better, and the latter is much modified by the peculiar structure of the tissue. The progress of disease in bones and their appendages, from their organization, is necessarily very slow, as well as the process of recovery. A simple incised wound of the flesh will unite in two or three days, when the parts are brought in apposition,



whereas a broken bone will require a month; and the same tardiness is perceived in the development of suppuration in inflamed bones, and in the throwing off of sloughs, or necrosed portions of bone. The effects of simple inflammation in bones is bad enough, but the protracted and painful course of syphilitic, scrofulous, and other specific inflammations in bone is well calculated to try human patience.

Bones are the common seat of various tumors, simple or malignant.

### PERIOSTITIS.

This is an inflammation of the periosteum or covering membrane of a bone.

This affection is not uncommon, and may be produced by any of the causes which produce inflammation in other tissues, as cold, mechanical injuries, syphilis, gout, scrofula, rheumatism, etc. It constitutes one of the forms of whitlow, and is likely to destroy the use of the finger. In deep-seated abscesses, where the pus comes in contact with bone, it very often inflames the periosteum. It may be **acute** or **chronic**, the latter being most common.

**Acute Periostitis.**—In this form of disease of the fibrous covering of the bone you have all the ordinary signs of inflammation—heat, redness, swelling, and pain; the part is more vascular, its color becomes reddish or pinkish instead of white, it is tender to the touch, and the periosteum is thickened and softened; its adhesion to the bone is less firm, sometimes to such a degree as to be easily peeled off, and the cellular tissue around is infiltrated with serum and lymph.

Acute periostitis not unfrequently results in suppuration, particularly in the bones of the lower extremity, as well as in the fingers. Its progress in some cases is very rapid, as in whitlow. Mortification of the membrane sometimes occurs, and with it, usually, more or less necrosis of the bones, from their vascular connection.

**Symptoms** of periostitis are violent pulsatile pain, with œdematous swelling, heat, and fever; when pus forms there is an increase and softening of the swelling, pitting, glossy, erysipelatous appearance of the skin, with fluctuation.

When periostitis is the consequence of syphilis, the pains are always worse at night, particularly when the patient is warm in bed. The gouty and rheumatic forms must be made out from the history of the case, the symptoms not being in all cases distinguishable. One peculiarity of these forms is the migratory character as to its seat, and the frequent involvement of joints.

**Treatment.**—The first step is to ascertain the cause; to know whether the inflammation is simple, or specific. In the simple forms, whether traumatic or not, it is to be treated on the general principles of inflammation.

In the specific forms, syphilitic, gouty, etc., the specific taint must be met by the appropriate remedies.

The most important local remedies are leeches, iodine, blisters, saturnine, and cooling lotions, together with anodynes. Suppuration, from the density of the structure, is often difficult to detect, and when there is much tension, with severe pain, it is often proper to make free, deep incisions down to the bone; this often gives great relief, and arrests destructive disease.

Of internal remedies, iodide of potash in doses of five or ten grains, three times a day, affords most relief in the syphilitic form. In the gouty form, colchicum, purging, etc. are the remedies.

**Chronic periostitis** is the most common form, and the membrane becomes greatly and extensively thickened from the deposition of lymph. Instead of being widely diffused, it is, in some cases, confined to detached points, appearing in little nodules. The enlargement becomes very hard, not only cartilaginous, but often bony.

The causes of the chronic are the same as the acute, and the symptoms are also the same, but less violent. They are remarkably persistent, intractable, and require persevering treatment, usually with specific remedies. Iodide of potassium and mercury, Donovan's solution, arsenic, blisters, iodine, etc.

### ENDOSTEITIS, OR OSTEOMYELITIS.

**Endosteitis, or osteomyelitis,** is an inflammation of the endosteum, or medullary membrane.

The causes of this disease are usually traumatic: fractures, gunshot wounds, lodgment of foreign bodies in the substance of a bone, blows, the saw in amputations, etc.; cold is also a cause, as well as syphilis, gout, etc.

**Morbid Anatomy.**—The appearances are much the same as the external periosteum: the membrane inflames, thickens, softens; the marrow is melted down, and suppuration occurs; the external periosteum opposite generally becomes involved, and the intervening bone is necrosed.

The symptoms are difficult to diagnose in many cases, being like

those attending inflammation of the bone and its fibrous envelope. In fact, it is only after an injury, amputation, etc., that we can, in most cases, make the disease out. When the end of the bone is exposed, and inflammation of the endosteum takes place, the symptoms may be watched and the diagnosis made.

It is a very serious malady, involving the constitution deeply—not only giving intense local suffering, but resulting in phlebitis and pyemia, with all their terrible consequences.

**Treatment.**—This is antiphlogistic. When the cavity of the bone is exposed, it may be washed out with astringents, etc.; when the cavity is not exposed, the pain and constitutional symptoms excessive, and the disease suspected, we should cut down on the bone and make an opening with a trepan, to let the pus out and relieve the tension.

### OSTEITIS.

Inflammation of the bone itself is not uncommon, particularly in young subjects, in whom the vascularity is great. It may be **primitive, consecutive, acute or chronic, simple or specific**. It may be limited to a small point of bone, or wide-spread.

The spongy parts suffer much more frequently than the compact, and they ulcerate readily, while the latter are more liable to necrosis. The bones most likely to suffer are those least protected by soft parts, as tibia, ulna, clavicle, cranium, etc. It is very slow in its progress, although occasionally it travels with extreme rapidity, running even to necrosis in a few days.

**Changes** which take place in the bone as the disease advances.

**Terminations.**—Osteitis may end in resolution, the parts gradually assuming their natural condition; or the disease may cease, leaving the bone enlarged and hardened; or it may pass to suppuration, ulceration, softening, or mortification, as seen in the soft parts. A bone rarely regains its natural size.

**Causes.**

**Symptoms.**—These greatly resemble periostitis, and it is often impossible to make a diagnosis; but this is of no great practical importance, as the same treatment is applicable to both.

**Treatment** must be conducted on general principles.

**Constitutional remedies.**

**Local remedies.**

**Suppuration and Abscess of Bone** are common in all parts of bones, but when they occur on the surface, the connections of the parts

are so intimate, and the symptoms of the two so alike, that we cannot determine whether it commenced in the bone or periosteum. Inflammation pervades every part of the substance of the bone, and suppuration may follow its march in every crevice. It occasionally happens that when a bone is sawn across, pus is seen oozing from every pore. When this occurs, the normal structure of the bone is more or less broken down and softened. In very rare examples, we see well-defined, circumscribed abscesses in the substance of bones. They are generally of very slow formation, and occur mostly in the spongy parts of bones, and particularly in the extremities of the tibia.

The abscesses vary from the size of a pea to an egg, and contain very ill-conditioned, fetid pus. They may make their way into the joint, or be surrounded by a cyst, which gradually expands to considerable size as the pus accumulates.

The **symptoms** of formation of pus here are much like those in the soft parts, except that the pain is much more excruciating and the influence on the constitution is much more violent. There are intense throbbing, lancinating pains, which are worse at night; fevers of high grade, restlessness, emaciation, and frequent rigors.

The only treatment that can give relief is the evacuation of the matter by the trephine.

It is sometimes difficult to hit the exact spot, and it becomes necessary occasionally to apply the trephine to several points. When successful, the operation gives immense relief, and the recovery is often rapid.

### CARIES, OR ULCERATION.

This affection of bone is analogous, in every particular, to ulceration in the soft parts. Inflammation occurs, softening follows, with disintegration of the bony structure, and discharge of ill-conditioned pus. Caries differs from osteites in this—the latter is an inflammation of the bone, with inflammatory deposits, enlargement, etc., but without breaking down or softening of the structure, and formation of pus; in caries suppuration, the bone is softened and broken down in structure.

Caries attacks principally the spongy bones, as the vertebra, the innominata, carpal, and tarsal bones, etc.; while necrosis attacks the shafts of long bones and compact structures.

Young persons, particularly children, are most subject to caries.

**Causes.**—Caries almost invariably arises from some specific taint of scrofula or syphilis, particularly the former; but mechanical injury, or any of the causes of inflammation already detailed, may rouse it into activity.

**Morbid Anatomy.**—The whole mass affected shows the marks of inflammation: it is softened, infiltrated with pus, and contains numerous little cavities, full of the debris of the bone; it is soft, and can be cut with a knife. The surface often has a ragged, worm-eaten appearance, as in the cranial and other compact bones.

Danger of joints being implicated.

**Symptoms.**—In first stage, those of osteitis; and the diagnosis can only be made after it has progressed to a certain point.

**Sinuses.**

**Discharge.**—Generally unhealthy and fetid.

**Constitutional disturbance.**

**Prognosis.**

**Treatment.**—General; local.

**Operations** for relief.

**Process of Reparation.**—Granulation, etc.

## NECROSIS.

By this term is meant the death of a part or the whole of a bone, and in reality is nothing more than mortification in the soft parts. Gangrene, mortification, are terms which have been applied to destruction of vitality in a soft part, from inflammation or other causes, and they would apply just as well to the same condition in a bone. Custom, however, has decided differently.

Most common in the long and compact bones.

In the idiopathic form it is most common in strumous children, but not uncommon in adults, from traumatic causes.

**Causes.**—Are all those which have a tendency to produce inflammatory affections, as well as those specific causes before alluded to, viz., cold and damp, foul, badly-ventilated apartments, mechanical injuries, scrofula, syphilis, gout, rheumatism, abuse of mercury, etc.

Denudation of a bone in any way of its **periosteum**, by mechanical injury, exposure to unhealthy pus, etc., is a common cause of necrosis, though it does not invariably produce it. A bone may granulate healthily after this investment has been stripped off, and the injury inflicted be fully repaired without exfoliation.

**Extent of Necrosis.**—It may be very extensive, or limited to a small spot; it may attack the external surface, the internal, or the whole thickness of a bone; except in small bones, as those about the feet and hands, it is rare that an entire bone is necrosed. The entire lower jaw has been affected by it from the action of phosphorus, and in young subjects from that of mercury.

The symptoms which usually precede necrosis are, up to a certain point, precisely those of osteites and abscess in bone. The soft parts around become involved in the inflammation and suppuration, and when the matter has formed in and around the bone, if not relieved by an opening, it soon or late works to the external surface, into a neighboring joint, or most convenient exit; not unfrequently the pus burrows to a considerable distance along the bone, and the abscesses thus formed among the soft parts are sometimes enormous.

When the abscess is freely opened and discharged, the relief is great, and an opportunity is afforded, by aid of the probe or finger, to explore the parts fully and ascertain the nature and extent of the injury. If a part of the bone feels rough, we know at once it is dead. The process by which the "line of demarkation" is formed, and the dead bone is cast off from the sound, though very like the process by which sloughs are thrown off from soft parts, requires much greater length of time—not only weeks, but often months. The cause of this difference is explained by their comparative structure.

Where the outer **surface** of a bone is affected and is cast off, it is called **exfoliation**. Where the whole thickness, to some extent, dies, it is called a **sequestrum**. An exfoliation is the casting off of the superficial lamellæ of a compact bone, which becomes changed in color and consistence. A **sequestrum** may involve a part of a shaft, or the greater part, including one or both of the articular extremities. The dead portion is always rough, worm-eaten in appearance, or spiculated, of grayish, brownish, or, when exposed much to the air, blackish in color.

**Reproduction.**—While the tedious process is going on by which the bony slough is detached, nature sets to work to repair the injury and provide a substitute for what is lost; the tissues around, and the detached periosteum, through the agency of their capillary circulation, throw out around the dying bone plasma, which is gradually organized, and passes through the stages of fibro-cartilage, cartilage, and finally bone, the process occupying, according to age and other circumstances, weeks or months. The new bone is at first a mere shell, encasing the old, but gradually becomes thickened to the extent of three to six lines, being almost or quite as strong as the original bone. The surface is very unlike, the latter being uneven and rough, and the whole formation is very hard, often having almost the density of ivory. In the long bones there is never a complete formation of the medullary canal, and the entire formation is unlike original bone, and has less capacity to resist disease or injury.

The new bone is pierced at various points by openings of different

sizes called *cloacæ*, through which pus and fragments of the dead bone are discharged. These openings are probably attributable to deficiency of the periosteum, from which the bone is formed. Sometimes these openings exist as long fissures. These openings discharge pus, and communicate with openings on the external surface. "It is an interesting fact, and one of no little practical value, that these openings are always situated in that portion of the new bone which is least covered by soft parts."

Where the necrosed portion is simply a thin scale, the injury is repaired through granulations from the exposed surface of the sound bone. This is the case, whether the scale is from the external or internal surface.

**Symptoms** of necrosis.

**Prognosis**            "

**Treatment**           "

### SOFTENING OF BONES, OR OSTEOMALACIA.

This malady is often improperly confounded with *rachitis*, but differs from it in being a disorder of adult life, and being always accompanied by severe pain. *Rickets*, on the contrary, is peculiar to infancy, and free from local suffering.

**Extent** of the disease.

**Morbid Anatomy.**

**Causes.**

**Age and Sex.**

**Symptoms.**

**Diagnosis.**

**Treatment.**

### RACHITIS, OR RICKETS.

This is an affection of the bones, characterized by a deficiency both of its earthy and organic elements, as is shown by the diminished quantity of carbonate and phosphate of lime, and the absence of chondrin and gelatin.

Is a disease of infancy, occurring usually in the second year, and even earlier; very rarely as late as the tenth or twelfth year.

**Causes.**

**Morbid anatomy.**

**Symptoms.**

**Diagnosis.**

**Prognosis.**

**Treatment.**

**Fragility of bones** is rather an effect of disease than a disease.

**Causes.**

**Symptoms.**

**Treatment.**

## TUMORS.

The bones, like the soft parts, are subject to these affections, both in the simple and malignant forms. The former are: **exostosis**, **fibro-cartilaginous** growths, **aneurism**, **hematoid** formations, **serous cysts**, **hydatids**, and **myeloid** tumors. The latter, **encephaloid**, **colloid**, **scirrhous**, and **melanosis**.

**Exostosis** may be regarded as a simple, local hypertrophy, the bony tumor or excrescence projecting from the sound bone, being similar to the latter in structure; it is a bone drawing from a bone.

Most common in young subjects.

They vary in size from a shot up to enormous bulk.

May occur on any bone, but most common in the superficial ones; may be one or many.

**Shape.**

**Causes.**

**Structure.**

**Progress.**

**Diagnosis.**

**Prognosis.**

**Treatment.**

**Fibro-cartilaginous** tumors, or **enchondroma**, may be developed in the cancellated structure, or on the outer surface of bones, beneath the periosteum. Its figure is globular; surface nodulated, consistence firm; color white or grayish; composed of fibrous and cartilaginous substance.

It ordinarily affects one bone, is not malignant, and gives little inconvenience except from its size; peculiar to early life; slow in progress, and may occur simultaneously on several points of the skeleton; may occur anywhere, but most common in metacarpal bones, on the fingers, humerus, and lower jaw. It has been called **osteosarcoma**, a senseless term. When of long standing, often undergoes ossification.

**Remedy**, excision.

**Aneurismal** tumors of bone resemble aneurism by anastomosis in structure, being a development of small vessels. Its favorite seat is the head of the tibia, although it may occur elsewhere. Always



commences in the cancellated structure. After it has developed to a certain point, deep-seated pain and pulsation are felt, like in aneurisms. Sometimes very large.

Amputation is the only reliable remedy.

**Atrophy of bones.**

**Hypertrophy of tumors.**

**Sero-cystic tumors.**

**Hydatid tumors.**

**Malignant formations.**

**Neuralgia of bones.**

## FRACTURES.

By the term fracture, is meant a sudden solution of continuity in a bone, produced by mechanical violence, or muscular contraction; in plain English, a fractured bone is a broken bone.

The subject of fractures is perhaps the most important that can engage the attention of the surgeon; they are the most frequent of all important injuries, the least generally understood, and the most generally badly treated. The reputation of young surgeons suffers more frequently from malpractice in this department than any other.

Fractures have been divided into simple, compound, and complicated. They are also divided into transverse, oblique, longitudinal, incomplete, and comminuted.

The liability to fracture differs much with age, and other circumstances; in children, for example, where the animal matter predominates, bones fracture with much difficulty; while in old people, where earthy matter predominates, they break easily.

The causes of fractures are generally divided into predisposing and exciting.

The long bones, for obvious reasons, are more easily fractured than short ones; and where two long bones run parallel to each other, like the tibia and fibula, they rarely give way on the same level.

There are many general considerations connected with the subject of fractures, but they may be more forcibly illustrated when we come to speak of individual fractures; there is one remark, however, that I would insist upon, namely, the importance of an early and thorough examination, with the view of establishing the diagnosis. If neces-

sary, the surgeon may use anæsthetics to enable him to accomplish his object fully. It is also a fixed rule, that the sooner a fracture is dressed, the better.

**Repair of Bone.**—When a bone is fractured, besides the solution of continuity in the bone itself, and consequent rupture of its blood-vessels, there is more or less injury of the surrounding soft parts, contusion, rupture of capillary vessels, etc. The first result of these injuries is an effusion of blood in and around the fractured extremities of the bone, and the next is the development of inflammation in the injured tissues around, with considerable swelling, heat, and tenderness. Very soon the absorbents set to work to remove the effused blood, and as the absorption takes place, there is poured out in its stead a mass of plasma or lymph from all the injured and inflamed substances, namely, from the external and internal periosteum, the extremity of the bone, and the surrounding inflamed tissues.

This substance is poured out in considerable quantity, resembling a pinkish jelly, and envelopes completely the extremities of the bones; this is the first step toward the formation of bone, and reparation of injury. It becomes gradually more firm in consistence, passing through the stages of fibrin, fibro-cartilage, and cartilage, consuming from eighteen to twenty-five days, at which time the deposition of callus or bone commences. The delicacy and steadiness of this process shows the importance of setting broken bones as early as possible, and retaining them in perfect quietude.

The process by which the osseous matter in the cartilage is deposited is identical with that by which the original bone is formed, and the bony matter is mainly, if not exclusively, deposited from the vessels of the periosteum. Dupuytren, by a series of well-conducted experiments on dogs, and other animals, established certain principles in the reparation of bone, which were supposed to be equally applicable to man, and which have been received by the profession, generally, as established facts. In animals, the mass of plasma surrounding the extremities of the bones is transformed into callus, and the internal periosteum throws out a plug of callus which blocks up the cavities of the bones at their extremities, and passes through from one to the other, connecting them together when they are in direct apposition. This mass of external and internal callus was called, by Dupuytren, **provisional callus**, as it is intended to serve a temporary purpose.

It is imperfectly organized bone, and there is a great excess of it around the extremities, forming frequently a considerable lump. A

new action is then set to work, by which the great mass of the external callus is removed, as well as the internal, thus opening the medullary canal again; and the bony matter remaining, by which the fragments continue united, gradually assumes the structure of the original bone, and was denominated, by Dupuytren, **definitive callus**. This is the process which really takes place in animals, and has, until recently, been supposed to take place in man, occupying a space of several months for its completion. The recent experiments of Mr. Paget, and others, have clearly shown that this process is not applicable to man. In the latter there is no deposition of provisional callus, but, on the contrary, when the extremities of the bone are placed in apposition, there is a direct fusion by what Dupuytren calls definitive callus; and even in these cases where the bones overlap, the deposition of callus takes place only from the surfaces in contact, the periosteum for a short distance around, and also the medullary membrane at the broken extremities.

Where the bones are not in accurate apposition, and more particularly where they overlap to a greater or less extent, the deposition of bony matter is greater in proportion to the displacement of the bone, other things being equal. As the deposition of callus goes on, the medullary opening in the bones becomes closed, and the rough margins are gradually rounded off, and a perfect union takes place between the sides of the bones, giving them a regular, smooth, curved appearance. This process, for its entire completion, consumes months, and probably sometimes years. The work of nature is so perfect that even a medullary canal is often channeled through this unnatural connection.

**Treatment of Fractures.**—The manner of transporting patients with fractured limbs.

The importance of a good **fracture-bed**.

The importance of dressing fractures as soon as convenient after the injury.

**Diastasis, or Separation of the Bones at their Epiphyses.**—This is an accident that may occur up to adult age, or the period at which perfect ossification takes place, but is most common from the fifth to the fifteenth year. The symptoms of this lesion much resemble those of fracture, the principal difference being in the indistinctness of crepitation, and less liability to great displacement of the fragments. The prognosis is generally favorable, union taking place quite as promptly as in fracture. The treatment is also the same as in the latter accident.

**Ununited Fractures.**—Fractures occasionally refuse to unite, in consequence of some deranged condition of the constitution, bad management on the part of the surgeon, or misconduct of the patient. The process of union varies very much as to time, owing also to the condition of the system, or external causes. In some cases the bones do not unite at all, their extremities being rounded off, and smooth, like the surface of joints; in others the fragments are united by ligamentous or fibro-cartilaginous adhesions; in some instances an artificial joint is formed with a lining membrane and outer covering, resembling a synovial membrane and capsular ligament.

**Causes** which prevent the union of bones.

**Treatment of ununited fractures.**

**Vicious union of fractures.**

Symptoms and treatment.

**Diseases of the callus.**

Causes, symptoms, and treatment.

**Particular fractures.**

Fractures of the nasal bones. Symptoms and treatment.

**Fractures of the upper jaw and malar bone.**

**Fractures of the Lower Jaw.**—This bone may be fractured at its symphysis, or any point between this and its articulation; most commonly, however, the fracture takes place somewhere between the angle and the eye-tooth; it may be transverse, oblique, or longitudinal, single or multiple, simple or complicated.

Occasionally there is a fracture on each side of the chin, so as to isolate it completely; sometimes a longitudinal fracture of the alveolar process, detaching it, with the whole of the jaw-teeth, from the body of the bone.

**Causes of fracture.**

**Symptoms.**—Crepitation; irregularity in the teeth; displacement of the bone to the touch, at its lower margin, and where there is a double fracture; drawing down of the chin by the muscles attached to the os hyoides. Fracture of the ramus or condyle may be detected by careful manipulation and eliciting crepitus, and the unnatural mobility of the bone at the fractured point.

**Treatment.**—Simple fractures of this bone are usually easily managed, and union takes place in from four to five weeks; the fragments are easily adjusted by passing the fingers along the base of the

jaw, bringing the teeth in their proper line, and placing them fairly in contact with those of the upper jaw, the mouth being firmly closed. If any teeth should be loosened, they should be retained by all means in their proper position, and allowed to adhere there. If necessary, loose teeth may be bound to neighboring sound ones by a silver wire, or other ligature.

These cases are easily treated by the application of a piece of thick binders' board, sole leather, or felt, softened by water, and retained in position by a proper bandage, all of which will be demonstrated in my lecture. In complicated comminuted cases much difficulty frequently occurs in keeping the bones in proper apposition; the surgeon is here obliged to rely upon his own ingenuity to meet the difficulties. The mouth being necessarily firmly closed during the whole treatment, the patient must be nourished by fluid food, as broths, gruel, milk, etc., taken through a tube or from a spoon.

#### **Fracture of the hyoid bone.**

Symptoms; treatment.

**Fractures of the Clavicle.**—For obvious reasons these are the most frequent in the human frame. They may be simple, compound, or comminuted; unilateral or bilateral; transverse or oblique. The fracture is almost always oblique; the usual point of separation is at or near the middle of the bone where it is thinnest and weakest. Where the fracture is complete, the outer fragment being drawn downward, forward, and inward by the weight of the arm and shoulder; the inner fragment is slightly drawn up by the action of the mastoid muscle. Where the fracture is near either extremity, the displacement is comparatively slight, owing to the firm ligamentous attachments of these portions.

**Causes,** direct and indirect.

**Symptoms.**—The shoulder drops below its natural level and turns forward and inward, the head and body incline toward the injured side, the arm cannot be rotated or hand carried to the face, and the patient instinctively supports the part by placing the opposite hand under the elbow, thus taking the weight of the arm off from the injury. There is usually a marked angular deformity of the bones, which is removed by thus pressing the arm up. Notwithstanding the variety of apparatus which has been contrived to overcome the difficulties, it is very rare to see a union of these bones without more or less deformity; union, however, is perfectly solid, and the limb is as strong and useful as ever; it is only objectionable in females,

where the part is exposed from their mode of dress; but even here, unless the treatment is very bad, it soon ceases to be observable. In ordinary cases consolidation takes place in the adult in about five weeks, and in children in eighteen or twenty days.

**Reduction.**—All that is generally necessary is to take hold of the elbow and to carry the arm upward, outward, and backward, a procedure which rarely fails to effect approximation of the ends of the fragments. The object of treatment is, by some contrivance to retain the arm in the position it is placed after reduction. An infinite variety of apparatus has been contrived for this purpose, most of which are complicated and useless. I usually treat it simply with three pocket-handkerchiefs; the first is used as a sling, the center being placed under the elbow, and the extremities tied around the neck sufficiently tight to elevate the injured shoulder above the level of the opposite one; this should be carefully watched and retained in this position, in order to make the humerus act more completely as a lever; the elbow is brought as far forward as possible across the chest, and the hand carried up toward the opposite clavicle. The second handkerchief is used like the first, as a sling to support the hand; and the third is tied across the elbow and around the chest for the purpose of confining the elbow firmly in this position. This simple apparatus answers all practical purposes. It is customary with most surgeons to apply a wedge-shaped pad in the axilla, extending down near the elbow, about two or two and a half inches thick at the upper extremity; I have rarely found this necessary to keep the bones in apposition, and prefer to dispense with it where it can be done, as it is frequently uncomfortable from the pressure upon the large blood-vessels and nerves. This apparatus, like every other for fractured clavicle, should be applied next to the skin, and the dress arranged over it, as a fracture of this bone requires perfect quietude until the process of union is completed.

Instead of the above apparatus, particularly in young subjects who are restless or unruly, long strips of adhesive plaster form an excellent substitute, and, in fact, may be considered, on account of its immobility, as the most perfect of all dressings. The adhesive plaster should be cut into strips about two inches in width, and sufficiently long to pass under the elbow and over the shoulders, and around the body in various directions; so arranged as to confine the limb in the position above described. The great advantage of this dressing is, that it rarely requires readjusting before the union is complete; all other apparatus, on the contrary, being made of yielding material, will stretch more or less, and require constant tightening

to keep the parts in position. Many other contrivances of good construction are in use, as those of Velpeau, Fox, and Lewis, all of which will be described.

**Fractures of the Scapula.**—Fractures of this bone are rare, but may occur in any part, from direct violence; the body may be broken in various directions, the spine may be severed from the body, the neck may be fractured, or the coracoid process; but the most frequent point is the acromion process.

The latter may be fractured in various ways, by direct or indirect violence. The **symptoms** are: the natural rotundity of the shoulder is destroyed; the outer fragment is drawn down by the weight of the arm, which hangs motionless by the side of the body; the head of the humerus can be felt in the axilla; there is a depression at the situation of the fracture; the distance between the shoulder and the top of the sternum is diminished, and a distinct crepitus may be detected on pushing up the arm in contact with the displaced fragment.

The **union** is usually ligamentous, instead of osseous, owing to the difficulty of preserving the contact of the fragments.

In the treatment of these cases, all that is necessary is to push the humerus up, place it in the same position as in fractured clavicle, and retain it there by appropriate apparatus; the head of the humerus is thus made to act as a splint, retaining the acromion in its proper position.

The fracture of the **neck** of the scapula is so exceedingly rare, that some good surgeons have doubted its possibility, unless from gunshot or penetrating wounds.

The **symptoms** are: The acromion is unusually prominent; the head of the humerus is felt in the axilla; the shoulder has a flattened appearance; the limb is lengthened; the coracoid process is thrown down below the clavicle, between the deltoid and pectoral muscles; severe pain and numbness are experienced in the axilla, and a distinct crepitus is perceived on rotating the arm upon the scapula.

**Diagnosis.**—A negligent surgeon might confound this with dislocation of the humerus; but a comparison of the symptoms of these different affections will readily guard against error. The treatment is the same as for fracture of the clavicle; but it is a bad injury under any circumstances, and likely to be followed by stiffness, weakness, and paralysis of the limb.

Fractures doubtless occur through the glenoid cavity, which are

difficult to diagnose, and which may explain some of the cases of ankylosis occasionally met with.

Fracture of the **coracoid process** is of very rare occurrence, and is difficult to detect on account of the contusion and swelling which usually accompanies it; the treatment is the same as for fractured clavicle.

The fractures of the **body** of the scapula need not detain us, as their detection and treatment are matters of common sense.

**Fractures of the Ribs.**—The central ribs, from their exposed and fixed position, are much more liable to fracture than the upper and lower ones, and more apt to break at or near the middle; these fractures may be simple, compound, or comminuted, and sometimes give a great deal of trouble by being complicated with wounds of the intercostal artery or lung. A fracture, instead of being at the point where the force is inflicted, may occur on the opposite side, from what is termed counter-stroke; one rib or a half dozen may be broken at the same time; the single fracture is usually a trifling injury, while a multiple one is very grave on account of the great violence which produces it. A fracture may usually be detected by placing the hand directly on the seat of pain and directing the patient to cough or take a long inspiration, when motion or crepitation will be felt. If this fails, the two hands should be placed flat upon the chest, one on either side of the suspected point, and first one and then the other pressed firmly against the ribs with a kneading motion; the hands may be moved about to various points in this way, and crepitation will be almost certainly felt if fracture be present; the patient is usually conscious of grating at the point of fracture, which is accompanied by a very sharp sticking pain, with inability to take a full inspiration. Where the lung is wounded by the points of the rib, there is generally spitting of blood, and occasionally emphysema. In the latter case, the air may fill the cavity of the chest, causing a hollow sound on percussion, and total extinction of the respiratory murmur, attended with great increase of dyspnoea. When the air escapes from the chest it becomes diffused, through the cellular tissue, beneath the skin to a greater or less extent. The ribs being firmly united at their extremities to the spine and sternum, and laterally to each other through the intercostal muscles, they are not subject to overlapping or much angular derangement like other bones. Where the fracture is the result of great direct violence, one fractured extremity is sometimes depressed below the level of the other; a simple uncomplicated fracture is rarely attended with



danger or difficulty. Where the pleura and lung are injured, the case is more serious. Emphysema in itself is not a symptom of much consequence.

**Treatment.**—Fracture of the ribs without complication or displacement is best managed by encircling the chest with a broad bandage drawn sufficiently tight to compel the patient to perform respiration chiefly by the diaphragm, the intercostal muscles, thereby rendering the ribs perfectly passive. The bandage should be from eight to ten inches wide, and long enough to extend twice around the body. The ends being fastened by two pieces of tape, a shoulder strap is attached to prevent the cloth from slipping; a common roller, properly applied, answers the purpose well, or, what is far better than anything else, strips of adhesive plaster three inches wide, and long enough to lap at the extremities; several of these should be applied very tightly after expiration, and arranged around the chest one above another; these never slip or stretch, and may remain until the cure is complete. In females, a well-laced corset will answer every purpose, a triangular piece being cut out at the lower front part to allow due play to the diaphragm; a compress over the point of fracture gives additional support. If the collection of air within the chest is such as to produce dangerous dyspnoea, it may be evacuated by a small trocar passed into the chest by a valvular opening between the ribs. Antiphlogistic remedies, local and general, as well as the free use of opiates, are in many cases indispensable.

**Fracture of the costal cartilages** is a matter of extreme rarity. The symptoms and treatment of this injury are the same as for fracture of the ribs; the union taking place by bony matter, and never cartilage.

**Fractures of the Sternum.**—Fracture of this bone may take place in any part, is usually oblique, sometimes transverse, and in rare cases longitudinal. Generally in this fracture there is little or no displacement of the fragments, but, on the contrary, one is sometimes considerably depressed below the other; like fracture of the rib, it is accompanied with great dyspnoea, and commonly spitting of blood. Where there is displacement, the nature of the injury is evident at a glance; where there is none, it may be detected by directing the patient to cough, while the hand is placed firmly along the sternum; by pressing the sternum with the fingers at various points; or by making the patient lie on his back, with a pillow beneath his shoulders.

The displacement in most cases is easily corrected by making the

patient sit up, placing the knee on the back between the shoulders, and drawing the latter back with the two hands.

The **prognosis** of this injury, from the violence done, is usually unfavorable by its cause to the internal organs of the chest; where there are no complications, the recovery is not difficult.

The **treatment** is by compress and bandage, upon the same principle as fracture of ribs, together with proper constitutional remedies according to symptoms.

**Fractures of Vertebrae.**—From their mode of articulation, strength of ligaments, and muscular coverings, fracture of these bones is extremely difficult. The causes are direct violence or contre-coups. Any portion of the body or processes of these bones may be broken, but an accurate diagnosis is impossible; the most important symptoms are those dependent upon the particular point of the injury, from the intimate connection which exists between the vertebrae and spinal marrow.

**Difference of symptoms** where the fracture is above or below the fourth cervical vertebra, implicating the spinal marrow.

#### **Fractures of the pelvic bones.**

**Fracture of the Coccyx.**—I have seen and recorded some curious facts in connection with the fracture and displacement of this bone, which will be explained in my lecture.

**Fractures of Superior Extremity.**—The symptoms and treatment of fractures of the fingers and metacarpal bones are so obvious and so dependent on the general principles already laid down, that little need be said on the subject here. The whole hand usually requires to be splinted in these cases; the fracture of a single finger cannot well be treated by applying a splint to it alone, but requires to be bound to one or more fingers to secure sufficient quietude.

**Fractures of the Shafts of the Radius and Ulna.**—Fractures of these bones may take place from direct or indirect violence, may occur at any point, but is most common in the inferior half, and the two bones rarely give way on the same level. The angular derangement, mobility, and crepitation usually declare the nature of the accident at once; all power over the forearm is lost, and there is acute pain at the seat of injury. The consolidation takes place in from thirty to thirty-five days, and the principal danger to be guarded against is the encroachment of the fragments on the interosseous

space, for, when union takes place under these circumstances, the rotation of the limb is greatly impeded.

**Treatment.**—The usual mode of treatment, after making gentle extension and counter-extension and adjusting the fragments, is—first, to apply a bandage from the fingers to the elbow, the arm being bent at right angles; next, two well-padded splints of binders' boards, thin wood, or other light material, and sufficiently long to extend from the extremity of the fingers to the elbow, are placed on the inside and outside of the arm, and firmly fixed in their positions by a roller from one extremity to the other, the thumb being kept up all the time; the arm is then carried across the chest and suspended in a sling.

I violate these received rules in two particulars: first, I apply no bandage to the arm itself; and second, I use shorter splints, the outside one extending only to the carpus, and the inside extending only to the roots of the fingers, the hollow of the hand being well filled with cotton or some other soft material.

My reasons for all this will be fully explained to you.

**Fractures of the Ulna.**—Where the shaft of this bone alone is fractured, it is most common below the middle, and may be produced by direct or indirect violence. The fracture is detected by an irregularity along the lower margin of the forearm, mobility, and crepitation on rotating the hand; the lower fragment alone is displaced, being drawn inward by the contraction of the pronator quadratus muscle. The danger in the treatment of this injury is, that the upper extremity of the lower fragment should remain in its unnatural position, be fixed there, and thus interfere with the rotation of the limb. This difficulty is best prevented by splints curved at the lower extremity in a manner to incline and fix the hand in the opposite direction or toward the radial margin. The head of the ulna is sometimes broken off alone, is easily detected, and treated by the method last mentioned.

**Fracture of the Olecranon.**—This may be the effect of direct violence or muscular contraction.

The **symptoms** are: semiflexion of the limb, impossibility of extending the forearm, a hollow at the back of the elbow, and a movable prominence above the elbow at a distance of one, two, or three inches. It is possible for a fracture of the extremities to take place above the expansion of the tendon of the triceps muscle, without displacement of the fragment. The **union** of this fracture is always by fibro-liga-

mentous matter. The period required for the repair of the injury is from six to eight weeks.

**Treatment.**—A splint well padded is applied on the front, extending from the middle of the arm to the middle of the forearm, for the purpose of maintaining the limb in a straight position; a roller is then applied from the hand up to the neighborhood of the elbow, when the displaced fragment is pushed down to its natural position, and firmly fixed there by long strips of adhesive plaster; the bandage is then resumed, passed around and over the joint in the form of a figure of eight, and then carried on to the upper extremity of the splint, where it terminates. Passive motion must be resorted to in favorable cases at the end of about three weeks, to prevent ankylosis. Where there is much contusion and inflammation of the part, antiphlogistics should be employed, and many days must pass before any tight bandaging can be used.

**Fractures of the Radius.**—Fracture of the body of the radius may occur at any point, independently of the ulna, and is more common than the same injury of the ulna alone; its most common seat is the inferior half of the bone, and its ordinary cause a fall upon the palm of the hand.

The **symptoms** are well marked: deformity, mobility, crepitation, pain at the seat, inability to rotate the hand; the ends of the fragments have a tendency to encroach on the interosseous space, and, if not watched, may lead to deformity. Either a false joint, or improper union in fractures, two or three inches above the wrist, are very apt to occur, and impair greatly the use of the limb. To prevent this deformity, two splints, shaped like the handle of a pistol in order to incline the hand to the ulna side, should be well applied, and I would strongly advise the omission of any bandage directly to the arm. Splints of this shape throw the upper extremity outward in its proper place, and consolidation takes place in about four weeks.

This bone occasionally gives way at its superior extremity, detaching its rounded head.

The **symptoms** are: depression at the point of fracture, the bone being displaced forward and inward; the best mode of detecting it is for the surgeon to grasp the hand, make extension, the elbow being grasped with the other hand, with the finger or thumb placed on the head of the radius; the arm being then rotated, the head of the bone will remain stationary, while the radius moves, and crepitation may be felt.

**Treatment**, in every respect, the same as for fracture of both bones of the forearm, the splints being made to come well up to the joint.

**Fracture of the Inferior Extremity** is one requiring particular study; it is of frequent occurrence, is often mistaken for dislocation, and is prone to endanger the use of the hand. On the other hand, swellings from sprains of the wrist are often mistaken for fractures or dislocations.

**Causes.**—Sponginess of bone, its articulation with the carpus, consequent connection with the hand, etc.

This fracture is most common in middle-aged and elderly subjects. It may take place in every possible direction, from the joint to an inch and a half above, usually more or less oblique, frequently running into the joint, and sometimes the extremity is divided into several fragments.

The most conspicuous symptom of this fracture is the singular deformity of the hand, giving the limb the appearance of a dislocation of the wrist joint. This is owing to the fact that the lower fragment, along with the carpus, is drawn upward and backward, from an inch to an inch and a half above the joints, by the action of the extensor muscles of the thumb, while the upper fragment forms a slight projection of the palmar aspect of the forearm. Immediately above the posterior prominence there is a depression. These symptoms are effaced by extension and counter-extension, and return as soon as they are omitted. The lower end of the arm has a rounded form; the hand is powerless and fixed; crepitus may usually be detected just above the wrist joint. Instead of being thrown backward, the inferior fragment is sometimes forced in the opposite direction, forming a projection in the forearm, beneath the flexor tendons.

**Treatment.**—The plan devised by Dr. Bond, of Philadelphia, is the one now generally employed, and meets the indications well. It consists of two splints, one of medium-sized binders' board, and the other of thin, light wood, furnished with a block and edges of thin sole-leather, about an inch in height, the whole presenting somewhat the appearance of a shallow trough. They are long enough to reach from a short distance below the elbow to within an inch of the knuckles of the metacarpal bones, the block of the latter resting in the hollow of the palm, and both being well padded with wadding. The splints are then placed in their proper position, and fastened in the usual manner. If one or more compresses are necessary to retain the fragments in position, they may be applied.

**Fractures of the Humerus.**—These are frequent, and very important.

**Shaft.**—Fractures at this point are the simplest and easiest treated.

**Causes.**

**Symptoms** are plain, the deformity, preternatural mobility, and crepitus being well marked. There is generally some shortening. The direction of the displacement depends on the point of fracture; if this is below the insertion of the deltoid, the inferior fragment will be drawn inward, but outward if it be above that point.

**Treatment.**—One broad splint on the inside and the other on the outside, made of sole-leather or binders' board, and extending from the elbow to the axilla on the inside, and curved so as to suit the shape of the arm, makes a convenient form of dressing. A bandage should be first applied from the fingers to the elbow, and then continued on to the shoulder, *over* the splints. If the bandage is coated from one extremity to the other with starch, it will retain its position much longer without derangement. Two curved tin splints, or four light wooden ones, may be made to answer well. I prefer, myself, two angular splints of binders' board, long enough to extend from the wrist to the axilla on the outside and inside. The forearm being thus motionless, there is less probability of derangement of the fragments. The hand should be placed in a sling, and the arm bound to the side. Consolidation occurs in a month.

**Inferior Extremity.**—A small portion or the whole of either condyle may be broken off; and it not unfrequently happens that a transverse fracture of the humerus occurs just above them, thus dividing the bone into three fragments. These are among the most painful, difficult to diagnose and treat, of any in the whole skeleton.

**Symptoms.**—When both condyles are severed just above the articulation, the radius and ulna project backward, a hollow exists at the bend of the arm, the forearm is slightly flexed, and the distance between the elbow and wrist is sensibly diminished. When both condyles are fractured, together with transverse fracture of the humerus just above, in addition to the foregoing phenomena, there is an increased width of the bend of the arm and an appearance of greater flattening. The accident, whether accompanied by this occurrence or not, is liable to be mistaken for dislocation of the radius and ulna backward; but the diagnosis may generally be readily determined by the fact that the symptoms which mark the former lesion promptly disappear on extending the limb, and that crepitus may be produced

when the forearm is rolled upon the humerus. When the inner condyle alone is detached, the ulna projects backward, but resumes its natural position on extending the limb; the condyle forms a tumor at the back part of the elbow; crepitus is discovered on bending the forearm; and if the forearm be extended, the humerus will advance in front of the ulna as the latter recedes.

A fracture of the external condyle is marked by the existence of a tumor at the outer and back part of the elbow, by crepitation on rotating the radius, by the supine position of the hand, by inability to move the joint, and by the constant semiflexion of the forearm.

In all of these injuries there are great pain and rapid swelling, which obscure the diagnosis. The latter, however, should be clearly established, if possible, and the use of chloroform will facilitate us much. Leeches and antiphlogistic remedies are often necessary before dressings can be applied.

The humerus is sometimes fractured transversely, but more frequently obliquely, when the symptoms simulate very closely those of dislocation of the ulna and radius backward; but gentle extension and counter-extension establish diagnosis. In children, a separation of the epiphysis may occur. In the hands of the best surgeons, all the fractures around this joint are troublesome, apt to result in ankylosis, and the use of the articulation is very slowly re-established.

**Treatment.**—The propriety of placing the limb in a flexed position is now conceded, though some surgeons prefer to treat the injury with the arm extended; the principal reason for preferring the flexed position is, that the hand will be more useful if ankylosis should occur, if maintained at right angles, than when extended. Various angular splints, made of binders' board, tin, or wood, long enough to extend from the wrist to the axilla, have been recommended, placed either on the outside and inside or front and back of the arm. They should be well padded, and great care should be taken, by means of proper compresses, to guard the points of the condyles from pressure, which might result in ulceration. Angular wire-splints, where they can be obtained, from their lightness and coolness, are preferable to all others.

Compound fractures of this joint are usually serious injuries, demanding, for the most part, amputation.

**Superior Extremity.**—This includes the head, together with the anatomical and surgical necks. By the former, we mean the narrow, constricted portion between the head and its tuberosities; and by the

latter, all that portion intervening between these prominences and the insertion of the broad dorsal muscle, its varying from an inch to an inch and a half.

**Fracture of the Head** is extremely rare, difficult to diagnose, and can only be treated by perfect repose of the limb.

**Fracture of the Anatomical Neck** occurs at all ages. This point, in children, being the line of the epiphysis, sometimes gives way, even up to adult age, when ossification proceeds tardily.

**Symptoms.**—This accident is very apt to be confounded with others. The head of the bone can be felt in the glenoid cavity; there is a slight hollow below the acromion, the axis of the arm is directed toward the coracoid process, and the elbow is somewhat separated from the trunk. Crepitation is either very faint or entirely wanting.

**Fracture of the Surgical Neck.**—This is also uncommon.

The injury is always attended with marked displacement; the superior fragment, yielding to the action of the supra- and infra-spinatus muscles, is drawn outward, while the inferior is drawn inward by the pectoral and dorsal muscles.

This accident is usually detected by grasping the point of injury with one hand, the elbow with the other, when both crepitation and unnatural mobility will be perceived on rotation.

The **treatment** of injuries at the upper extremities must be conducted on the same principles as those below. Well padded, curved splint, or binders' board, tin, etc., extending well up into the axilla, and a corresponding one on the outside, should be applied. The arm must be bandaged from the fingers up to the elbow, and the roller continued on over the splints to their upper extremity. A coat of starch will be found useful in retaining everything in position. A sling should support the hand, the elbow being left free, and the arm firmly bound to the side.

**Fractures of the inferior extremity.**

**Fractures of the Foot.**—Symptoms, treatment, etc.

**Fractures of the Tibia.**—It may give way at any point, but most commonly below its middle. Fracture of the shaft is most frequently oblique. It is usually readily detected, there being more or less depression, and perceptible irregularity, on passing the fingers along



the spine of the bone; the displacement is not great; in most cases where the tibia alone is fractured, the fibula, acting as a splint, keeps it in place. Where it is very oblique, and the upper fragment sharp, the projection may be considerable. When simple, this fracture unites in from four to five weeks.

Fracture of the internal malleolus is not uncommon, is more or less oblique, may vary in its direction, is often more or less comminuted, and more or less frequently accompanied by contusion, and followed by violent inflammation. It is often attended by fracture of the external malleolus or lower part of fibula. The diagnosis is easily recognized by the position of the foot, which is always turned upward and inward, as if partially dislocated; also, by crepitation and mobility of the fragment beneath the fingers.

**Treatment.**—This injury is easily managed by two splints extending from the foot to the knee, a little wider than the limb, with splint-cloth and proper pads; more complicated apparatus has been contrived, but this answers every indication.

Where the fracture is at the upper extremity of the tibia, whether involving the joint or not, it is best treated in a straight position by Liston's or Physick's modification of Desault's splints, which keep up the necessary extension and counter-extension, and give proper lateral support.

These injuries in the neighborhood of, or involving the knee-joint, are tedious, troublesome, dangerous, and likely to be followed by ankylosis. The wire splints, from their coolness, and facility with which they permit cold applications, are particularly applicable to this, and all injuries in the neighborhood of joints.

**Fractures of the Fibula.**—From its connection with the ankle-joint, fracture of this bone is common, and may occur at any point, but is most frequent in its inferior fifth. When these injuries occur in the shaft of the bone above they are easily detected, and require the same treatment as fracture of the tibia.

**Causes.**—It is usually the result of violent abduction of the foot, which causes the bone to give way about an inch and a half above the ankle. It is not unfrequently the result of direct violence from blows, wheels, etc. The upper extremity of the inferior fragment is always thrust inward, while the superior fragment remains in situ.

**Symptoms.**—Where the fracture is at the lower part of the fibula, there is a depression at the point of injury, with eversion of the foot. If there is fracture at the same time of the lower extremity of the tibia, the eversion and deformity are much greater. Upon taking

hold of the foot it will be found very movable; there will be crepitation; the foot is easily brought into its natural position, but the deformity returns as soon as the hand is removed.

These injuries are quickly followed by echymosis and swelling, which obscure the diagnosis. They can only be mistaken for a sprain, from which the distortion of the foot, mobility, and other symptoms already detailed, readily distinguish them. These cases are very tedious, requiring months for recovery when the joint is at all implicated, and often followed by more or less permanent stiffness.

**Treatment.**—The principal indication is to place the foot in the opposite direction from its distortion, and maintain it there. This is met by Dupuytren's splint, extending from the knee to a few inches below the foot, placed along the inner side of the leg, and covered by a wedge-shaped pad, with the thick end extending to the level of the heel. The foot and leg being thus well bandaged to the splint, the deformity is corrected by the foot being firmly drawn in.

**Fractures of both the Tibia and Fibula.**—These injuries are very common, important, and often badly treated; they occur most frequently below the middle, oftenest near the lower extremity, and rarely do both bones give way at the same level. The fracture is almost always oblique, the tibia giving way in a direction downward and outward. In consequence of this direction of the fracture, the upper fragment is usually displaced somewhat inward, the extremity being sharp and prominent, while the lower fragment is displaced outward toward the fibula.

The sharp extremity of the lower end of the upper fragment of the tibia is often thrust through the integuments at the time of injury, thus making a compound fracture; or it may work its way through by ulceration at a subsequent period.

**Symptoms** are well marked.

**Prognosis.**—In simple fractures a good cure may be secured in from four to five weeks. In the compound form months are often consumed, and not unfrequently they result in amputation, and sometimes in deformity.

**Treatment.**—Simple fractures of both bones are easily managed by two splints extending from the knee to the sole of the foot, a splint-cloth, and proper padding, where there is no shortening of the limb, or by splints or binders' board supported by the starch bandage. An important point is to preserve the great toe erect, and on a line with the inner margin of the patella. Where there is overlapping of the bones, and tendency to shortening, means should be resorted to

to maintain extension and counter-extension. The long splints of Physick or Liston, already alluded to, answer the purpose well. The apparatus of McIntyre, Nathan Smith, and many others, of complicated construction, have been resorted to, and are very useful. Instead of the gaiter, handkerchiefs, and bandages, which produce chafing and ulceration, long strips of adhesive plaster are now generally used for extending and counter-extending bands.

**Complicated Fractures of the Leg.**—These cases are the result, always, of great violence, and the injury done to the parts is so great that the first question often arising is, whether an attempt should be made to save the limb or not. Where the bone and soft parts are crushed by railroad car or other heavy weight, or where they are extensively shattered and torn by gunshot, or other violence, and more particularly where the ankle-joint is seriously implicated, a surgeon should not hesitate, but resort to amputation at once. The injury to the soft parts, including, particularly, large blood-vessels and nerves which preside over nutrition of the part, are generally more important than injury to the bone itself. When the bone is extensively shattered, and the circulation and sensibility of the parts below undisturbed, the fragments should be removed, and a chance afforded for preserving the limb. Where an extremity of the bone projects through the skin, and cannot be otherwise reduced, the wound should be enlarged with a bistoury. The treatment of all these bad fractures is much better managed by swinging the limb.

In all compound fractures, after the proper adjustment of the fragments, the wound should be dressed as other wounds, and the air carefully excluded. Where there is little tendency to shortening, compound fractures are exceedingly well treated by the common fracture-box, as it is termed, the limb being well imbedded in bran; and this may be, if thought proper, suspended, as before suggested.

### **Fractures of the patella.**

#### **Symptoms and treatment.**

**Fractures of the Femur.**—Fracture may take place in any point of the shaft, or in any direction through the extremities.

One of the most common seats of fracture is in the upper fourth of the shaft, and from two and a half to three and a half inches below the small trochanter. The line of fracture is almost always

oblique, extending from behind forward, and from above downward, being frequently from an inch and a half to two inches in length.

**Symptoms.**—These are generally very obvious; the limb is shortened from two to four inches, and is distorted by external angular derangement, both fragments being directed outward, and the upper lying in front of the inferior one; the extent to which the superior fragment is tilted forward has been much exaggerated by most writers, as it rarely reaches an angle of  $45^{\circ}$ . It is thrown forward by the action of the psoas and iliac muscles.

**Fracture at the Middle of the Shaft.**—This fracture is not common, and its direction is almost always oblique, extending downward and forward, and the upper fragment overlapping the lower. The limb is everted and shortened, and the symptoms altogether characteristic.

**Fracture of the Inferior Fourth of the Shaft.**—This is a particularly important injury, from its proximity to the knee-joint. The fracture is usually oblique, and its direction the same as those above described. There is considerable shortening of the limb, the point of the upper fragment being prominent in front, and that of the lower in the popliteal space, while the knee and foot are everted. Sometimes it is so low down that the point of the upper fragment may press upon the patella and displace it.

**Treatment.**—This is usually conducted among surgeons of the present day by splinting the limb in a straight position, and maintaining extension and counter-extension. We have already spoken of the importance of a proper **fracture-bed**. The endless variety of apparatus which have been contrived proves the difficulty which attends the treatment of this injury; and I do not hesitate to say that with the best apparatus, it is rare to see the cure of a fractured thigh without shortening from half an inch to an inch.

In children these accidents are most conveniently and best treated by an external and internal splint of binders' board, firmly supported by a starched bandage; the external one should extend as high as the crest of the ilium, and be supported by carrying the bandage around the pelvis; the inner splint should extend well up to the perineum. I may here remark that the starch bandage forms the best dressing in children, for all fractures of the upper and lower extremities.

In adults, the apparatus of Desault, modified by Physick, and that of Liston, are generally preferred. I agree with Dr. Gross, notwithstanding, that these are awkward and often unsatisfactory contriv-

ances. I show you one like that Dr. Gross is in the habit of using, which he calls a fracture-box.

The surgeon cannot be too vigilant throughout the course of treatment; the extending and counter-extending bands must be watched to prevent shortening; any projection of either fragment must be met by proper compresses; chafing of the heel, and other parts, must be guarded against, as well as displacement of the foot outward or inward.

Most surgeons recommend a bandage applied directly to the limb, from the foot upward over the thigh, for the purpose of controlling spasm of the muscles and swelling; but these indications are sufficiently met by the pressure of these splints, when properly applied, and I always omit it. A bandage, however well applied, in two or three days becomes either too loose or too tight, and the patient is much annoyed by its frequent readjustment.

Mr. Erichsen, of London, one of our leading authorities, prefers the **starch bandage** in the treatment of these fractures in adults, as well as in children, and applies it in the manner before described. I myself should be afraid to trust it in adults, but it may be useful as a precautionary measure if applied when the patient is first allowed to get up on crutches. It often happens that the union at this period is not so solid as the surgeon supposes, and distortion may take place if not guarded against.

The double inclined plane, by which fractures of the thigh are treated with the limb in a flexed position, is not now much employed; but I prefer it myself, when properly managed, to every other method. The principles on which it acts are nowhere well described, and are understood by few.

It is peculiarly applicable in fractures of either extremity, compound fractures, and in cases where both thighs are fractured. We might describe the apparatus of Dr. Nathan Smith, McIntyre, and others.

The period of consolidation varies according to age, treatment, and condition of constitution, etc. It takes place in children, under favorable circumstances, in from twenty-four to twenty-eight days; in the active period of adult life, from thirty-five to forty days; and still later in old persons. It is, however, most prudent for patients not to bear the full weight of the body on the limb for two or three weeks after he commences the use of crutches, as in some cases the callus unexpectedly yields and distortion follows.

**Fracture of the Inferior Extremity.**—This is extremely rare; is almost always the effect of direct violence; is accompanied with severe contusion, and often laceration, not unfrequently demanding amputation. The condyles, like those of the humerus, may be fractured in any direction; they may be single, double, or comminuted.

**Symptoms.**—Owing to the firm attachment of muscles and ligaments around the head of the femur, as well as the swelling and tenderness, the diagnosis is often difficult; but, by laying hold of the condyles with the two hands and passing them backward and forward, and also by pressing the patella firmly against the condyles, and by rotating the leg, diagnosis may usually be made out.

**Treatment.**—It is necessary in the first place to combat the local inflammation for some days before any dressing can be applied. It may then be treated either by placing the limb in the extended or flexed position, and sustaining it by the apparatus already described.

**Fractures of the Superior Extremity of the Femur.**—In this term we include the head, neck, and portion of the bone to which the two trochanters are attached. The neck is more liable to fracture in old persons, and particularly after the fiftieth year, than in the young. This liability arises from two circumstances: first, the increased brittleness of the bone with age; second, the change of the direction of the neck in relation to the shaft, it being oblique in young subjects, varying not much from an angle of forty-five, while it approaches a right angle in the aged.

From the great width of the pelvis and direction of the neck in females, they are more liable to fracture of the neck than the other sex. The student should study well the ligaments and muscles around this joint.

It is important to recollect that when the head of the bone is broken off, bony union rarely takes place, from the fact that the neck has a very imperfect periosteum, and is covered by a synovial membrane. The periosteum is the principal source of callus, and the synovial fluid interferes with union.

Fractures of the upper extremity are divided into those within the capsula termed intra-capsular, and those without termed extra-capsular.

Fracture of the **intra-capsular** kind may occur at any point and in any direction; but generally it is met just below the head, or between the head and center of the neck. The line of fracture is sometimes partly within and partly without the capsule, forming an interesting variety in connection with the question of bony union.

**The Cause of Intra-capsular Fracture.**—Trivial accidents generally produce it, such as a moderate blow or fall on the trochanter, a trip or false step in walking, sudden twitch, etc.

The **symptoms** of intra-capsular fracture are—1st. Shortening of the thigh. 2d. Eversion of the foot. 3d. Preternatural mobility. 4th. Crepitation. 5th. Change of position in the great trochanter. 6th. Pain at the site of injury. 7th. Peculiarity of patient's body in erect position.

**Shortening** is well marked in the standing or lying position. It varies from half an inch to more, depending in most cases upon the injury done the capsule; and increases from muscular contraction some hours or even days after the injury, amounting sometimes to two or even three inches. Sometimes no immediate shortening occurs, in consequence of the lower fragment catching against the upper one. **Mobility** is one of the most important symptoms: if the foot be seized and rotated, while the hand is placed upon the great trochanter, not only will great mobility be observed, but the trochanter will describe a smaller arc of a circle than when the neck is entire. Crepitation will also be felt, and if extension be made, the limb is easily restored to its natural length; but the shortening returns as soon as the extension is relaxed.

#### **Anatomical and pathological characters.**

**Mode of Repair of Intra-capsular Fractures.**—The union is by fibro-ligamentous matter, and not by bone. In many cases even this union does not occur, the ends of the bone being rounded off as in artificial joint, and occasionally nearly the whole neck is removed by absorption. The reasons why bony union does not take place here, are the anatomical characters of the parts already alluded to, and the impossibility by any apparatus of retaining the fragments in quiet apposition.

It cannot be asserted that intra-capsular fracture never unites by bony union, although it must be extremely rare; but it is well ascertained that where the fracture is partly within and partly without, good bony union may occur.

**Treatment.**—As before stated, intra-capsular fracture is an injury peculiar to old people, and the line of treatment to be adopted must depend mainly on the condition of the general health and strength. Most subjects would not bear the position and confinement necessary in this protracted treatment, which consumes some two or three months. In such cases, all that should be attempted is to place the limb extended over a comfortable pillow or cushion, and keep the patient at rest for a couple of weeks. The patient should then be

allowed to get up upon crutches and take gentle exercise; making up his mind to something like a false joint and weak limb for life. On the other hand, where the patient is robust and can stand the necessary confinement, some retentive apparatus should be applied, and the subject kept at rest the requisite time, for two reasons: 1st. Where the fracture is intra-capsular, ligamentous union will take place, thus making a comparatively useful limb. 2d. It not being always possible to make an accurate diagnosis, the fracture may be partly within and partly without the capsule; in this case perfect bony union may take place. Either the double-inclined plane, or the apparatus of Physick or Liston described, may be used, as good surgeons are divided as to the choice between the flexed or straight position. Treatment has to be persevered in for ten or fifteen weeks, and the patient carefully watched to guard against chafing, bed-sores, etc.

**Extra-capsular Fracture.**—The extra-capsular fracture is situated at the base of the neck of the femur, extending from above downward, and from behind forward, in the direction of the intertrochanteric line. As before stated, the upper portion of the line may extend inward into the capsule, infringing more or less upon the neck of the bone. This injury is often accompanied by fracture of one or both trochanters.

**Symptoms.**—These resemble very closely those of the intra-capsular variety. There is shortening from one to two or three inches; and a peculiarity is, it is as great directly after the accident as at any subsequent period. The knee and foot are greatly **everted**, and all muscular power over them lost. In some rare instances the foot is inverted, there is remarkable mobility of the limb, and the crepitation is also very distinct. On rotating the limb, while the hand is placed on the trochanter, the latter turns like the end of a stick; sometimes, however, the trochanter is broken off, when it remains stationary on rotation.

**Prognosis.**—This is not favorable, there being at the same time much injury, generally of both the bone and surrounding parts; more or less shortening is certain to occur, and life is often endangered.

**Treatment** differs in nowise from that of the shaft of the bone.

### **Impacted fractures of the neck of the femur.**

Symptoms and treatment.



**Fractures of the great trochanter.****Symptoms.****LESIONS OF THE SCALP.**

**Wounds.**—The only peculiarity about injuries of the scalp is their liability to erysipelas, and proneness to implicate the brain. These wounds require to be treated on the same principles as similar injuries elsewhere.

**Tumors.**—Sanguineous tumors, or collections of blood beneath the scalp, often occur from blows, and not unfrequently in infants, from contusion during parturition. The blood may be situated beneath the scalp, the occipito-frontalis, or pericranium. It varies much in quantity, color, and consistence, being fluid or coagulated. Where it is the result of a blow, it often presents to the finger the sensation of a depressed portion of bone with well-defined, hard edges; in most cases, however, it forms a considerable tumor or prominence. These accumulations of blood generally disappear under the effects of sorbefacients, iodine, etc. In other cases they become encysted, remaining for an indefinite period; in others inflame and suppurate.

Sebaceous tumors are also very common on the scalp.

Sanguineous tumors are not unfrequent. Fibrous, fatty, and most of the forms of tumor, simple and malignant, which attack other parts of the body, may also occur here, and require similar treatment.

**Concussion of the Brain.**—This is an exceedingly important subject, and has been a fruitful field of discussion.

The **pathology** of this condition is very imperfectly understood: a patient receives a violent blow upon the head by a fall or otherwise; its functions to a great extent are for a time annihilated; in some cases even death ensues, and yet on post-mortem examination no trace of lesion is found, and the pathologist is left to vague conjecture. This injury may be produced by indirect force communicated through the spine, as when a patient falls from a height, alighting on his feet or nates.

Concussion differs much in degree, and the symptoms differ correspondingly. For convenience, concussion has usually been divided by writers into three stages, viz., collapse, reaction, and inflammation.

**Symptoms.**—These differ much in *degré* and duration. When slight, consciousness may be disturbed or annihilated for a few minutes; the patient is prostrated; pulse and respiration feeble; sensation obtuse; reaction occurs in a few minutes, and all the symp-

toms pass off, except, perhaps, a dull headache and lassitude, which may last some hours. In the severer grades of this affection, the symptoms are much more marked, and may continue from one to several hours. There is great muscular prostration; the pulse and respiration are almost imperceptible; there is partial or entire insensibility; great pallor of the surface; nausea, with vomiting; pupil generally contracted, though not always, being sometimes natural or even dilated; the senses all in abeyance. The sphincters are all relaxed. In this state of collapse, the leading indication is to produce reaction by external and internal stimulants, fresh air, dashing the face with cold water, stimulating enemata, etc. While attempting to bring about reaction, the surgeon should bear in mind the fact that reaction is likely to be followed by inflammation, and he should be cautious to give no more stimulants than are absolutely necessary to start into action the depressed powers of life. The patient should be kept quiet for some time, and warned against dangers which may occur from the effects of the injury many days, or several weeks after.

The **inflammatory or febrile stage** constitutes the concluding stage, which usually occurs four or five days after the accident; but may come on weeks or months afterward. The leading **symptoms** of this stage are high fever, with all its usual attendants, severe pain in the head, intolerance of light, injected eyes, vigilance, delirium, etc., often terminating in spasms, paralysis, and coma.

**Anatomical characters.**

**Treatment.**

**Compression of the Brain.**—By this term we mean a displacement of a portion of the brain by mechanical pressure in any way, as that for example caused by a depressed portion of bone, effusion of blood upon the surface or within the substance of the brain.

**Symptoms.**—These vary somewhat in proportion to the extent and suddenness with which the concussion is produced; they are usually a very slow pulse, sometimes intermitting; respiration slow and stertorous; pallid countenance; dilated pupil; great disturbance of all the senses; paralysis of the half of the body opposite the injury, together with relaxation of the sphincters, and the drawing of the muscles of the face to one side.

In some few cases the paralysis exists on the side with the injury, and the dilatation of the pupil is also inconstant—sometimes one being dilated, the other not; and in others one or both are contracted.

**Differential diagnosis of concussion and compression.**

**Treatment** of compression must be regulated by the nature of the exciting cause.

Compression from **extravasation of blood**; situations of the extravasated blood; manner in which compression from this cause comes on; its **diagnosis** and **treatment**.

**Depression of bone**, unlike the last variety; the symptoms here come on immediately.

Compression of the brain resemble closely in symptoms those of **apoplexy**.

**Treatment.**

**Compression from the effusion of pus.**

### FRACTURES OF THE SKULL.

These fractures, like those of other bones, may present every possible variety, and are particularly grave, from the implication of the brain and its membranes.

The **causes** are direct violence, or indirect, communicated through the spinal column. The degree of force requisite to fracture the skull varies much in different subjects, according to its thickness and brittleness, a very slight blow in some cases producing fracture and depression. The bone usually gives way at the point of the blow, but not unfrequently there is severe fracture of the base of the cranium from **contre-coup**.

This subject is complicated and full of difficulties to the student. The following division will facilitate his studies: 1. Simple fracture of the skull, without depression. 2. Simple fracture, with depression. 3. Simple fracture, with displacement, and compression of the brain. 4. Compound fracture. 5. Fracture of the base of the skull. 6. Punctured fracture. 7. Fracture of the external table alone. 8. Fracture of the internal table alone.

**Simple Fracture, without Depression.**—In this injury there is a simple fissure of more or less extensive fracture, without external wound or material injury of the soft parts. The symptoms in these cases are generally obscure, there being no displacement of the bone to mark the diagnosis, and the treatment is simple.

**Simple Fracture, with Depression of Bone.**—The extent of the fracture in these cases, the bone being sometimes considerably shattered from the violence of the cause, is usually accompanied by symptoms of concussion; the membranes of the brain are likely to be injured by spicula of bone, and severe inflammatory symptoms occur, while those of depression are absent.

**Treatment.**—Much discussion has arisen on this point, as to whether the depressed bone shall be interfered with or not. The judicious surgeon must be guided by the circumstances of each particular case. Where there is simply depression of a portion of bone, without urgent symptoms, it should not be interfered with. Where, on the contrary, there is considerable depression, with comminution and severe contusion of the soft parts, it is better at once to cut down upon the bone, remove the loose fragments, and elevate the depressed portion.

**Simple Fracture, with Depression and Symptoms of Compression.**—The symptoms in this case are the same as those already described as belonging to compression; and we may here remark that their violence is not always commensurate with the extent of the depression.

**Treatment.**—Much discussion exists on this point also, some contending for the immediate necessity of elevating the bone, while others are opposed. Most surgeons are in favor of immediate trephining, in order to anticipate the long train of evils which often arise from this unnatural position of the bone.

**Compound Fracture** is characterized by an open wound communicating with the fracture, and there may or may not be comminution, depression, or other complication. The danger from this injury is threefold: from shock, from inflammation, and from fungus of the brain. Sometimes the membranes of the brain are ruptured, and a portion of the brain escapes. This is a very alarming, though not always a fatal symptom.

**Treatment.**—There being already an open wound, any depressed portion of bone should be at once elevated, loose fragments removed, and the case treated on general principles already detailed.

**Fracture of the Base of the Skull.**—These are always regarded as very grave cases, and are the result of great force applied to the vertex, or communicated through the spine. The symptoms are usually those both of compression and concussion, and the attention of the surgeon is often directed to the seat and nature of the injury by the discharge of blood or serosity from the ear, which takes place in those cases in which the fracture implicates the petrous portion of the temporal bone.

**Treatment.**—There is no room for operative interference here by the surgeon, the seat of the injury being entirely beyond his reach;

all that can be done is to treat the constitutional symptoms according to the principles already laid down.

**Punctured Fractures.**—By these we mean injuries or wounds of the skull by small penetrating instruments, such as bayonets, dirks, nails, etc.; and, though small and apparently insignificant, must be regarded as among the most serious injuries of the skull which we have to treat. Their great danger arises from the thinness and brittleness of the internal table, it being splintered and driven in in a conical form, so as to inflict more or less injury upon the membranes, and perhaps the brain itself.

They are not likely to produce symptoms of compression, but are almost always followed by violent inflammation.

Their nature is easily recognized by the introduction of the finger or the probe. If the patient escapes the immediate dangers of inflammatory action, he may be the victim, in after-times, of epilepsy, mental imbecility, etc.

**Treatment.**—On this point the surgeon should be decided. Trephining is the only remedy, and, however mild the symptoms may be, should always be resorted to where the inner table is depressed.

Fracture of the external table may take place alone, and is a comparatively trifling injury.

Fracture of the internal table alone may also occur, as proven by dissections, though the diagnosis is impossible.

**Depression without Fracture.**—This can only happen in children before the process of ossification is complete, and while the bones preserve a certain degree of elasticity. Sometimes depression or flattening occurs to an alarming extent, without fracture, from falls or severe blows.

**Treatment.**—All operative interference in such cases must be laid aside. Cool lotions and antiphlogistic remedies constitute the proper treatment, and the bone, from its natural elasticity and the pulsatory movement of the brain, generally resumes its natural position, and the patient does well.

**Apparent Depression.**—It is very important for the young surgeon to be aware of the possibility of this deceptive symptom, which has led many astray. It is caused in the following manner: A patient receives a severe blow on the head, and a tumor immediately occurs from the effusion of blood; on pressing the fingers over the surface, the middle portion will communicate a soft, excavated feeling, with

sharp defined circumference, as if the bone were actually depressed. This delusive appearance is caused by two circumstances: first, by the condensation of the tissues at the point of the blow; and second, the effusion of lymph around the margin of this deadened portion.

**Operation of Trephining.**—Circumstances requiring it, and method of performing it.

**Wounds of the Brain and its Membranes.**

Causes, Symptoms, and Treatment.

**Fungus of the Brain.**

Causes, Symptoms, and Treatment.

For reasons detailed in the Preface, I conclude my Syllabus here, hoping to complete it before another year terminates. There are some subjects, as the diseases of the Eye, the Ear, and Orthopedy, which must be regarded as specialties, and only to be touched in a general way, in a course like those of our colleges. The following subjects, however, will be lectured on in the college and hospitals, and as fully treated as time will permit, and will also be brought into the next edition of the Syllabus, viz.:—

**Injuries and Diseases of the Nose and its Cavities.**

“	“	“	Air-passages.
“	“	“	Neck.
“	“	“	Chest.
“	“	“	Jaws, Teeth, and Gums.
“	“	“	Mouth and Throat.
“	“	“	Rectum.
“	“	“	Urinary Organs.
“	“	“	Abdominal Organs.
“	“	“	Male Genital Organs.
“	“	“	Female Genital Organs.

Hernia.

Amputations and Excisions.

JAN. 23 1861.



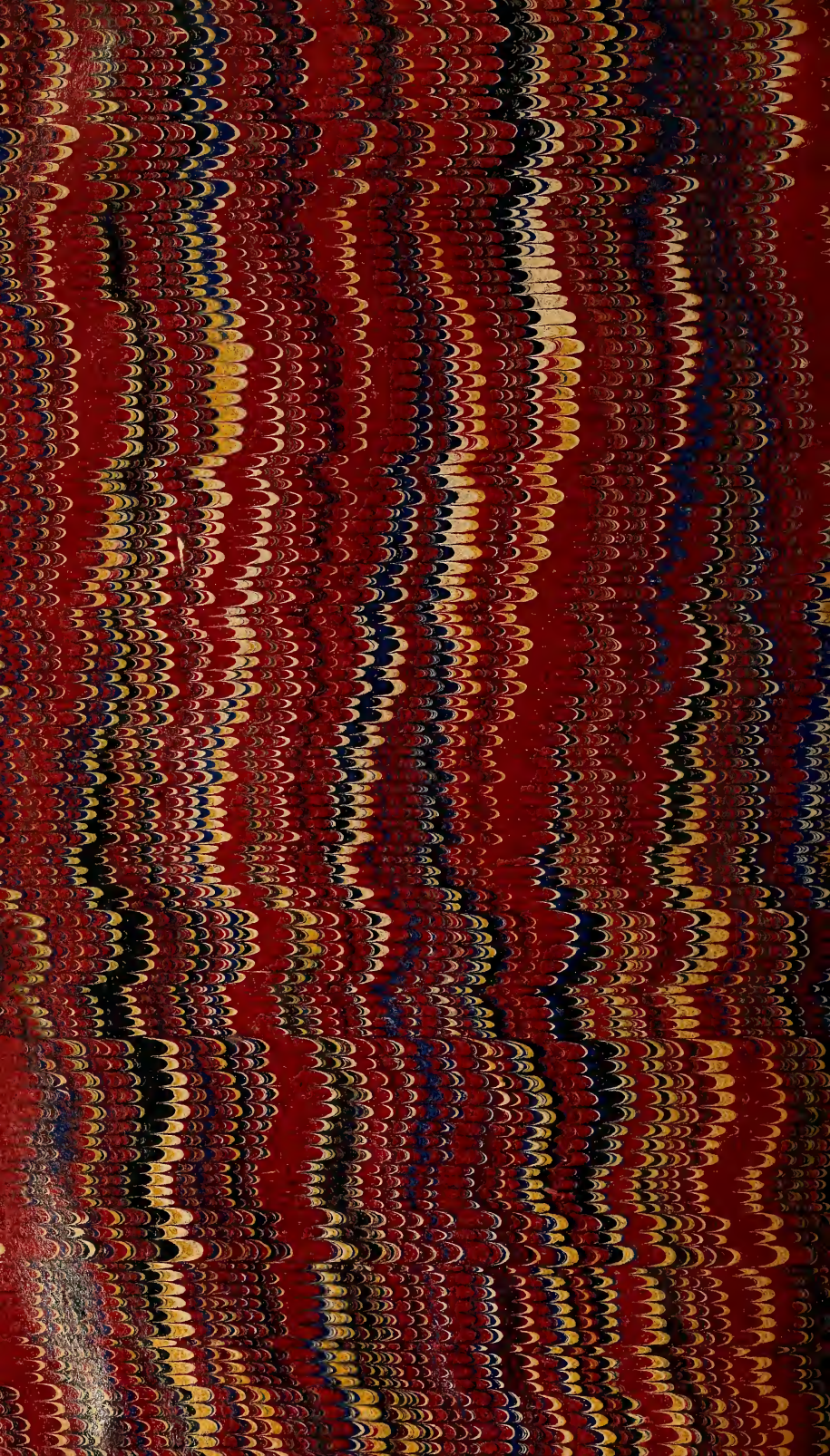














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